INDUSTRIAL ARTS and VOCATIONAL EDUCATION

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THE SCHOOL YEAR 1935–36

As the opening day of the school approaches, the INDUSTRIAL ARTS AND VOCATIONAL EDUCATION Magazine extends its felicitations to the shop teachers who will soon greet their classes for the first time in the new year.

Trials and disappointments will not be wanting, but these will not break down the resistance nor courage of those into whose hands have been laid the responsibility of teaching the industrial arts and vocational education, if they are met with fortitude and a sincere will and effort to solve each problem as it arises.

Forward with courage, then! The work of the year 1935–36 will surpass that of all its predecessors.

NEWS NOTES

The INDUSTRIAL ARTS AND VOCATIONAL EDUCATION Magazine and its readers are always interested to hear of and about the work of shop teachers, supervisors, directors, or others interested in industrial arts and vocational education.

Send in your news notes. They form interesting reading and will be used gladly by the Magazine.

THIS MONTH'S COVER

The picture chosen for this month's cover is a reproduction of a wood block by Paul Selms, taken from Volume 72, No. 1, 1935, *Archiv für Buchgewerbe und Gebrauchsbuchgraphik*, Verlag des Deutschen Buchgewerbevereins, Leipzig, Deutschland.

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Editorial Contributions—The Editor invites contributions bearing upon Industrial Arts, Vocational Education, and related subjects. Manuscripts, drawings, projects, news, etc., should be sent to the Publication Office in Milwaukee. Contributions are paid for at regular space rates. In all cases manuscripts should be accompanied by full return postage.

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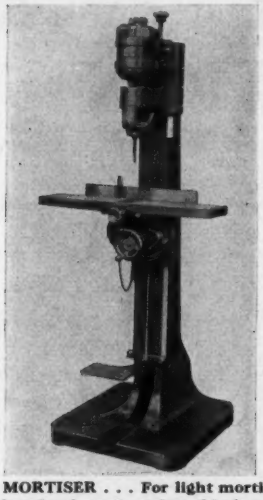

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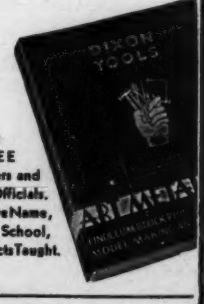

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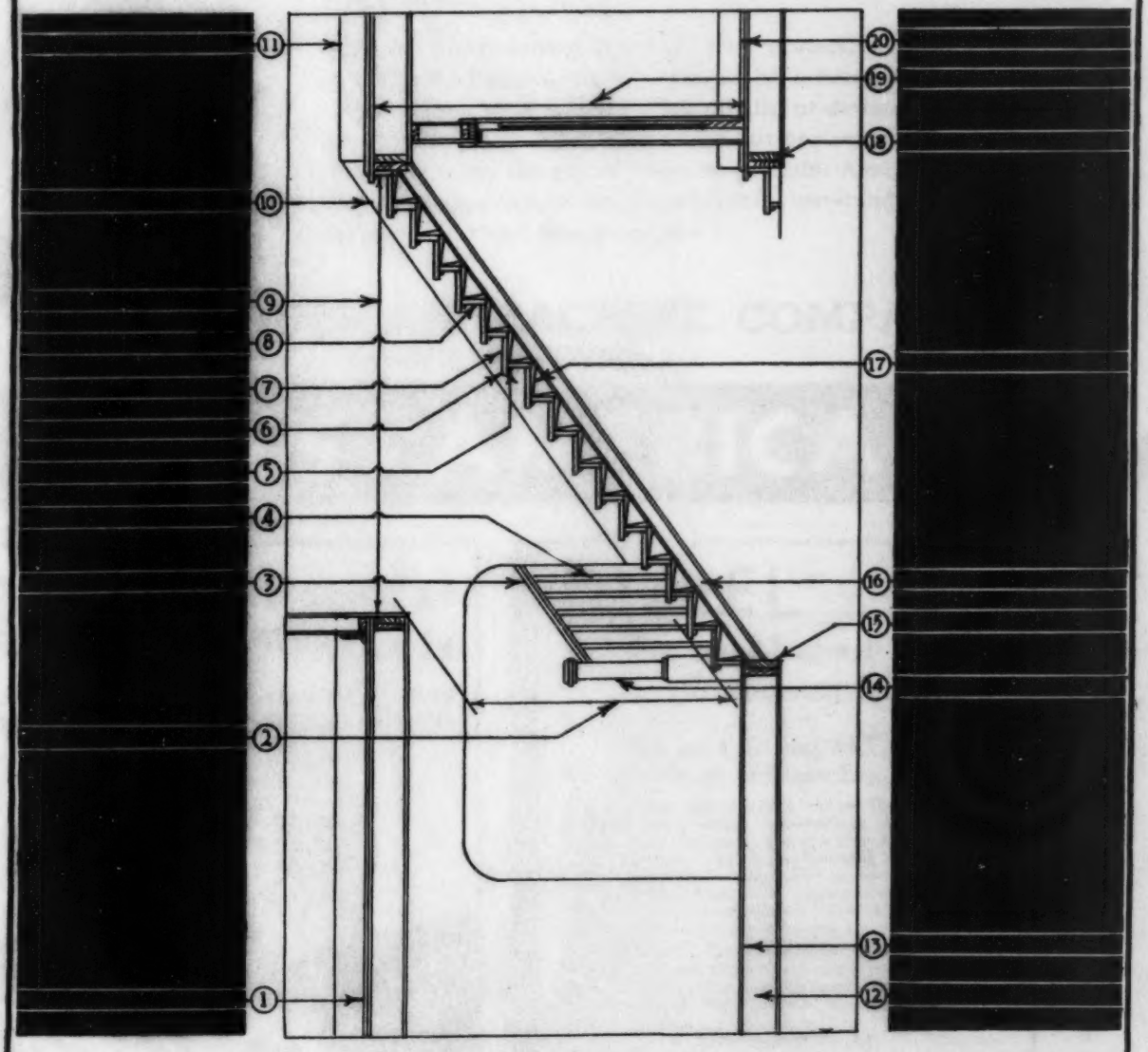
ARCHITECTURAL DRAWING
TEST NO. 6

STUDENTS ARE TO FILL IN THE NAME OF EACH PART OF THE SECTION OF THE STAIRCASE SHOWN BELOW. YOU WILL BE GRADED ON NEATNESS LETTERING AND ACCURACY.



STUDENT'S NAME [redacted]

Submitted by Ren Aton, Michigan City, Indiana

(Described elsewhere in this issue)

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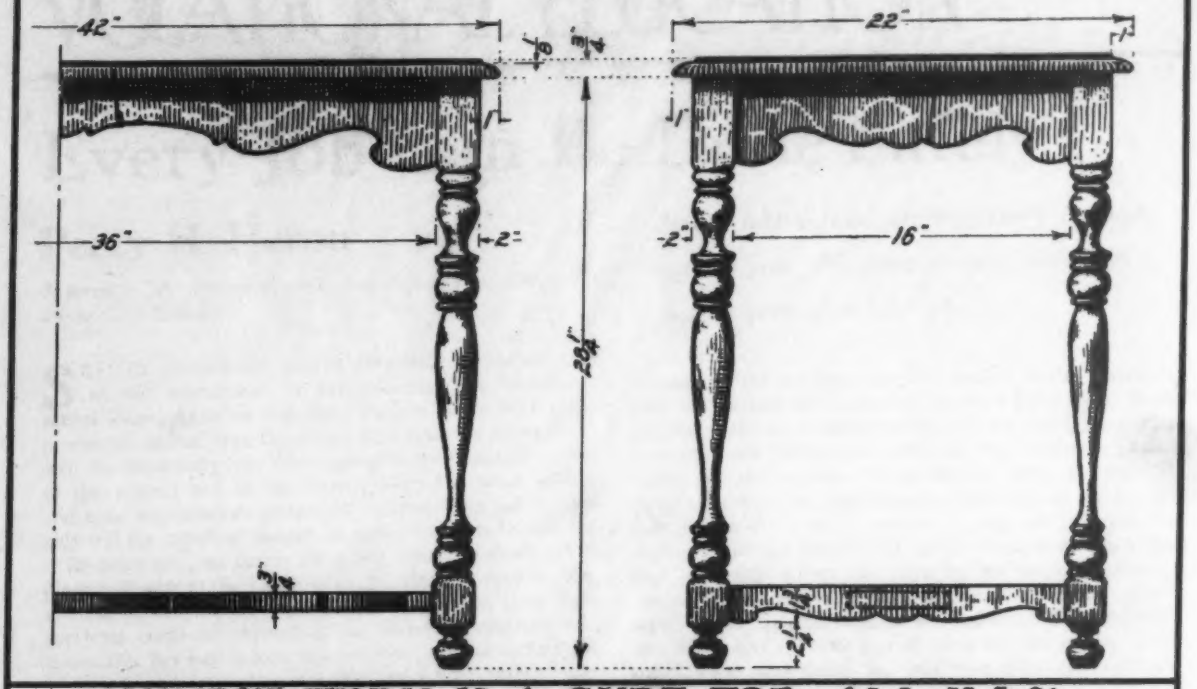
TABLE

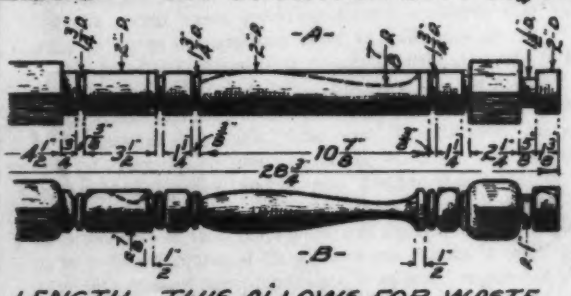
Advanced Woodwork

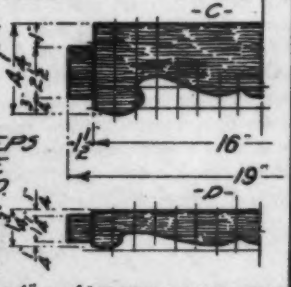
PROJECT SHEET A-306



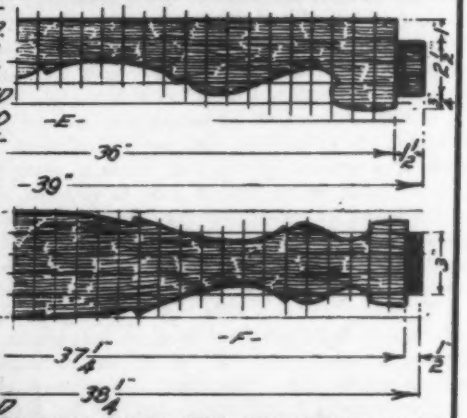
'HONEST WORK IS A CURE FOR ALL ILLS'

LEGS— CUT STOCK FOR LEGS 28¾ IN LENGTH. THIS ALLOWS FOR WASTE. CENTER STOCK AND SQUARE LINES TO INDICATE THE TWO SQUARE PORTIONS.— TURN THE OTHER PARTS DOWN TO 2⅛" DIA USE SKEW CHISEL TO PREVENT SPLITTING NEAR SQUARE PORTIONS.— W-100-A. WITH PARTING TOOL AND CALIPERS TURN TO THE DIAMETERS SHOWN AT -A- WITH COUGE WORK TO THE DOTTED LINES. COMPLETE THE STEPS AT -B- WITH COUGE AND SKEW.—W-100-C,D. SAND. LAY OUT THE MORTISES ON THE TWO POOREST SIDES OF EACH LEG. THE MORTISES ARE ⅜" X 2½" X 1½" DEEP FOR TOP RAILS AND ⅜" X 1½" X 1½" DEEP FOR LOWER.—



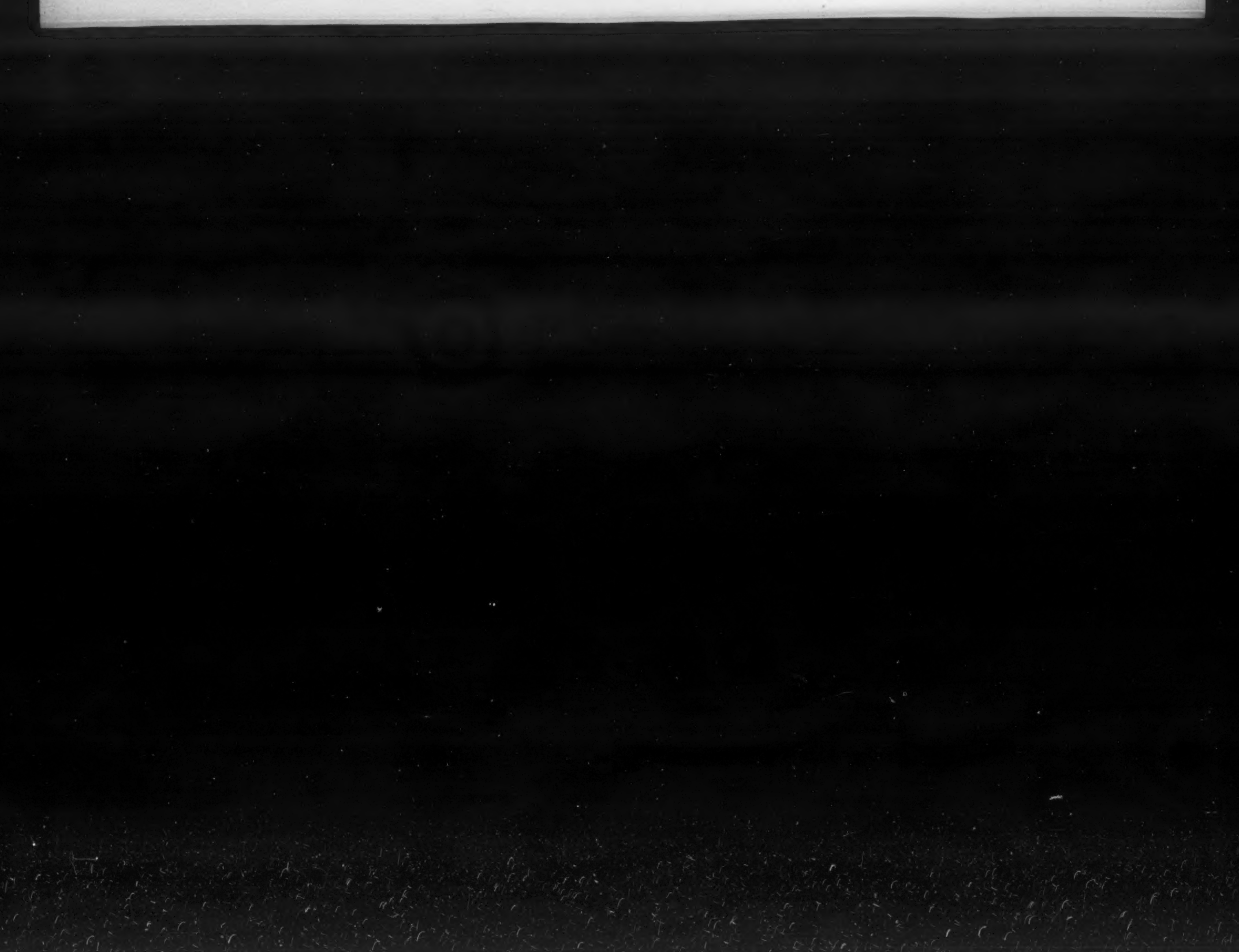


RAILS AND STRETCHER— THE STOCK MAY BE OBTAINED FOR THESE ALL TOGETHER. OBTAIN A FACE SIDE AND WORK TO ¾" THICKNESS. LAY OUT PATTERNS AND TRACE ON THE WOOD.— W-1, W-19. BAND-SAW AND WORK TO THE OUTLINES EXACTLY.— W-20. LAY OUT THE MORTISES ⅜" X 3" X ½" DEEP IN CENTER OF LOWER RAILS.— W-120. BORE ALL MORTISES AND THEN MAKE TENONS TO FIT. SAND ALL PARTS. MAKE A SAW-CUT ⅛" FROM TOP EDGE ON INSIDE OF EACH RAIL. GLUE ENDS TOGETHER. TEST FOR WIND AND SQUARENESS. W-3. NEXT GLUE THE SIDE RAILS AND STRETCHER TO ENDS. TEST AND REMOVE GLUE.—



TOP— GLUE PIECES FOR TOP, USING DOWELS. SQUARE-UP TO SIZE.— W-112, W-1. TAKE A ⅛" X 1" CUT ALONG EDGES ON TOP FACE. PLANE TO SHAPE. SAND EVERY BLEMISH OUT. FASTEN TOP TO FRAME WITH TABLE IRONS. INSPECT EVERY PART. SPONGE WOOD, RE-SAND, STAIN AND SHELLAC.— W-18, F-5, F-1.

Designed by Clifford B. Smith, Buffalo, New York



INDUSTRIAL ARTS and VOCATIONAL EDUCATION
September, 1935
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Every Job Can Be Done Safely

Percy H. Heron

Supervisor of Technical and Vocational Education, San Diego City Schools

Safety instructions are necessary throughout the year. The time to start with them is just as soon as school opens.

SAFETY precautions should constitute a leading part of the instructions in industrial-arts and vocational-school shops. Agencies that have made a study of accident prevention realize that the safety idea must be incorporated into the community life. When safety is systematically taught in the schools and in the homes, when the press, people, and civic organizations co-operate in promoting safety, then only will the appalling number of public accidents be checked.

In every city, no doubt, there are minor accidents taking place each year in the school shops, of which we hear nothing, and one or two serious accidents may occur in a state. Such accidents could be avoided if the proper precautions were taken. One has but to look through court reports to find that accidents have occurred which cost the school district thousands of dollars, besides placing serious handicaps upon students for the rest of their lives.

Some recent cases involving serious accidents that have gone as far as the appellate court in California are:

Damgaard v. *Oakland High School District, Alameda County* (298 Pacific Reporter 983). This case was an accident in which action was instituted for injuries sustained by a student in a chemical experiment. The court, in substance, charged that if jury found that explosion occurred and plaintiff was injured thereby, and if jury further found that thing which exploded or caused explosion was under management of defendants or their employees, and that explosion was such as in ordinary course of things does not happen if those who have management use proper care, it afforded reasonable evidence, in absence of explanation by defendants that accident arose from want of care on part of defendants.

The jury, upon being instructed, retired and presently returned a verdict in favor of said minor in the action brought in his behalf for the sum of $15,000, and in the action brought by the parents of the minor for the sum of $387.

Meade v. *Oakland High School District, Alameda County* (289 Pacific Reporter 987). A student in class studying oxyacetylene welding held entitled to recover from school district for instructor's negligence in furnishing improper oxygen gauge, causing explosion, without meeting requirements of statute as to notice and knowledge of defect by school district. In this case the plaintiff was with a student named John Jensen to braze a piece of brass, the Jensen boy being more experienced to do the work and the plaintiff to watch the operation. Upon starting work, the boys discovered that the gauge on the oxygen tank was leaking. When this was reported to the instructor he instructed them to remove the gauge assembly from the tank and he went to the adjoining automobile shop to get another. At that shop he asked the automobile instructor for the gauge which he had borrowed the day before. Presumably getting that gauge, he returned to the welding class and gave it to the Jensen boy with instructions to connect it to the oxygen tank. Jensen laid the gauge on a nearby table and the plaintiff connected it to the tank. When the connection was made the plaintiff turned on the pressure in the oxygen tank. Instantly the gauge blew out, the glass from its face striking the plaintiff, resulting in the loss of one eye, a cut on the nose, and slight cuts on the chest. After the accident, it was discovered that the gauge given the boys by the welding instructor was one registering 400 pounds only and not capable of withstanding the high pressure in the oxygen tank, which pressure when applied consequently blew out the gauge. Verdict for $35,000 was given but was eventually cut by higher court to $16,000.

Ahern v. *Livermore Union High School District, Alameda County* (284 Pacific Reporter). This case involved action by a manual-training student against the high-school district for loss of two fingers severed by power saw. Appellate court could not say that he was not guilty of contributory negligence, but was unsupported by evidence, in view of the fact that the defendant was only 14 years of age and testified with other students that no instructions were given relative to necessity of using a guard to the saw.

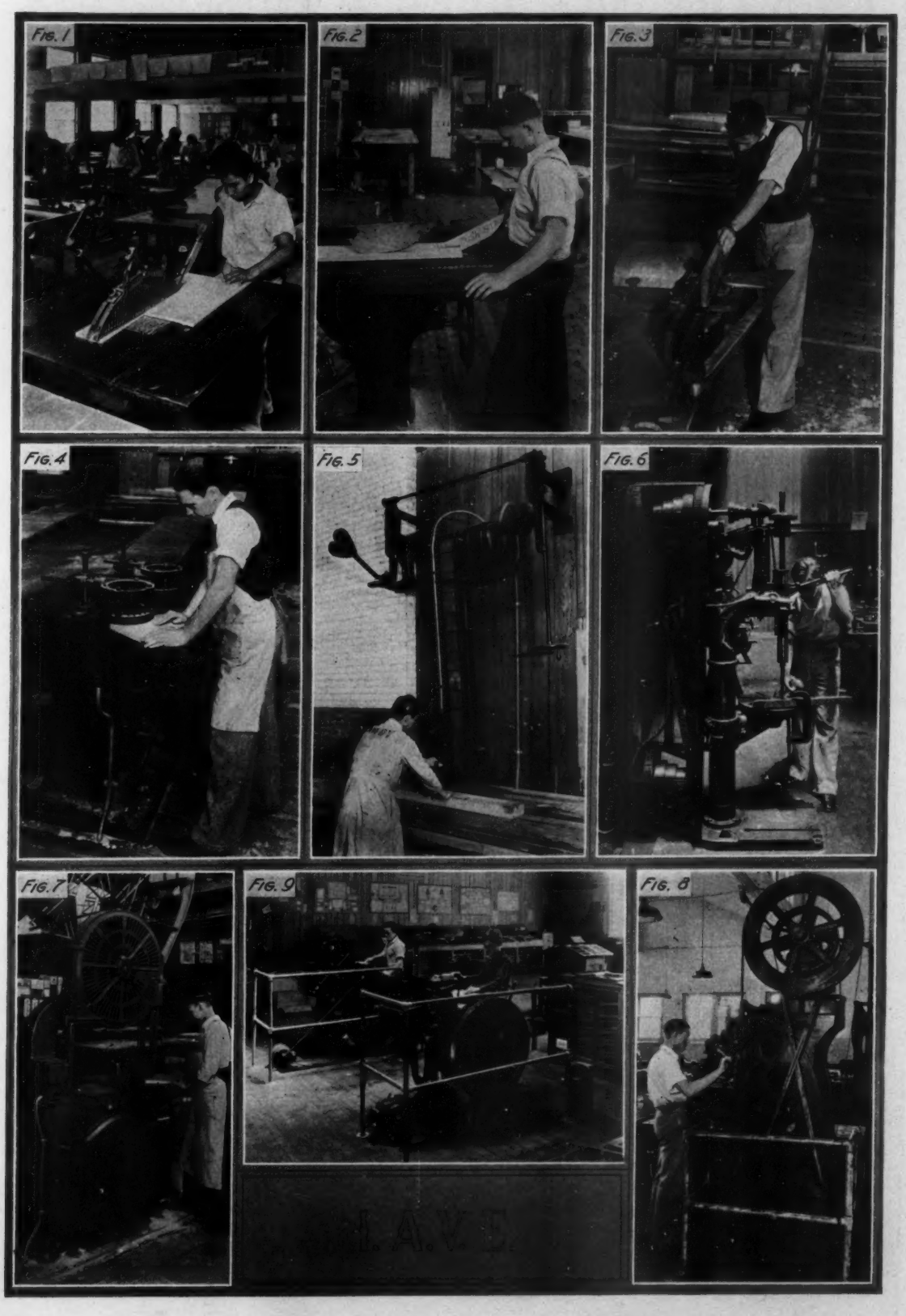
Many serious accidents are not caused by negligence on the part of the school employees, and many accidents which are considered the cause of school authorities are never brought into court. Such was the case of one that happened in San Diego several years ago.

It was alleged that the defendants, the board of education, the instructor in one of the high schools, and a student, negligently operated and controlled a wood-turning lathe in the woodshop of the high school; that a piece of wood was forcibly and with great speed hurled upon and against plaintiff, striking plaintiff on the head and thereby causing permanent and serious impairment of his sight, the total loss of the left eye and removal thereof by amputation. In this case the innocent bystander was injured. The boy had entered the shop just as a piece of wood was thrown from a faceplate and struck him in the eye. The fact that the turning tools being used by the boy at the lathe were the personal property of the instructor had an important bearing on the case. This case was settled out of court for $10,000.

To eliminate experiences of this kind, it is important that safety instruction be given in every school shop, and carried also into every activity that students are engaged in. Because of this, safety instruction is made a very important part of all instruction in the shops of the San Diego city schools.

In the woodshop, we try by example and lecture to de-

velop sound reasoning as to the best safety factor, repeating again and again that each boy must be his own guardian and rely on his own judgment as to what is safe. We then proceed to teach as many facts and bring to bear as many experiences as possible, in order to make these reactions automatic. There are safety guards and safety regulations on every machine. There are state laws governing safety factors on all machinery used in the school shops, of which the



student is emphatically informed. Besides the regular guards on machinery, special guards are arranged for any special jobs that may require it.

Figure 1 shows the circular saw in Memorial Junior High School. The guard is in place while the student is ripping the board. He is also using a push stick as an added precaution. A similar operation is shown in Figure 2. The guard on this machine is wood instead of metal. It works similar to the one shown in Figure 1.

Figure 3 shows the guard on a jointer in the San Diego High School woodshop. This guard is part of the equipment of this particular jointer as sold by the manufacturer.

Not many schools have shapers in their school shops as it is a particularly dangerous machine to operate. Figure 4 shows the guards in place while the student is shaping the edge of a board. All necessary precautions have been taken before the student is allowed to operate this machine, but when he steps up to do the work, it is up to him to carry on from there.

Another machine not common in a school shop is the swing saw. In the picture, Figure 5, the belt and the rim of the saw are both guarded. The student is taught to grasp the handle of the saw with the left hand, so that the work may be held with the right.

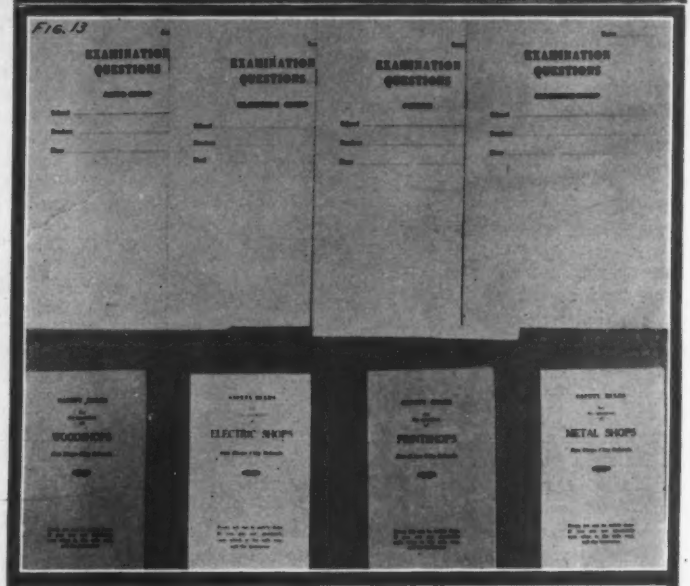
The drill press, Figure 6, has a homemade guard to house the running belt. This guard could be made an integral part of the machine by the manufacturer, thus adding much to the attractiveness of the machine.

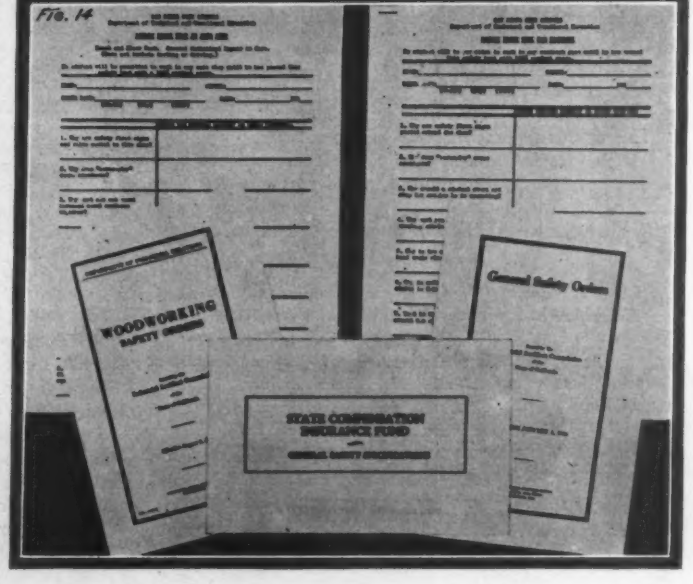
Many manufacturers are now embodying safety devices and guards in their machines. The machine in Figure 7 is well guarded. It is standing on a solid-concrete foundation and runs smoothly and efficiently without vibrating. Machines built in this way will last many years in the school shop, and although they may cost a few dollars more at the start, they will be found cheaper in the end.

The planer, Figure 8, shows a type of guard to protect the worker from running gears and belts. This is the railing type of guard. Another use of the railing type of guard is in the printshop where it is used to house the printing presses. The flywheel on the press in Figure 9 also is guarded by a disk which leaves no open spaces between the arms of the wheel.

Many shop kinks are used in safety education and protection in the electric shop. Figure 10 shows an oxygen tank held in place to keep it from falling over. This is done by the simple attachment of a strip of iron to the bench. In the electrical shop, safety instruction is made a definite part of the study schedule. Talks as to hazards and avoidance of same, action to take in emergencies, and instruction in Schaeffer (prone-pressure) method of resuscitation after electric shock are part of this class program. Figure 11 illustrates a cellophane guard used to protect the workers' eyes from small particles of grit that fly off the grinding wheel.

The first-aid equipment shown in Figure 12 contains the necessary articles for giving first-aid treatment. This type of equipment is found in every shop in the San Diego city school sys-





tem, and every shop instructor is familiar with first-aid procedure.

Besides using the regular instruction in safety, the automobile shop uses the California Vehicle Act, the Questionnaire for Operators and Chauffeurs, published by the California State Printing Office, and the Synopsis of State Traffic Ordinance, issued by the Automobile Club of Southern California, as a basis of safety instruction in the automobile classes. This is then supplemented by safety instruction in the use of machines other than automobiles.

Figures 13 and 14 illustrate the particular safety bulletins issued to the students in the various shops in our schools and also some of the supplementary material. All of the classes in the shop departments of the San Diego city schools are familiar with the general safety orders issued by the Industrial Accident Commission of the State of California, and this commission co-operates in every way with the school in order that the safety instruction to the students is made as effective, and as far-reaching in the lives of the students as possible.

Functions of Co-ordination—II

F. Lyman Tibbitts

Oklahoma City University
Oklahoma City, Oklahoma

A continuation of a study on the functions served by co-ordination in continuation-school work.

(Continued from July)

Employer Visitation

VIEWED in the light of the opinions expressed in the study of importance of certain major activities in co-ordination service, employer visitation ranks third among the eight. Vitality is injected into the school when it succeeds, by close co-operation, in increasing the efficiency of the boys and girls as wage earners. The job is the first interest of the employed boy or girl and other things must in a great measure revolve about the work and the employer. The better the school can serve the vocational interests of the pupils, the more effective it becomes in all of its endeavors. This can be accomplished with greater success when co-operation with employers is most effective.

The good co-ordinator seeks to carry out the following twelve activities:

1. By contact with the employer, he seeks to understand the pupil's work.
2. He interprets the part-time-school law to the employers.
3. He seeks to secure better co-operation between the school and the employer.
4. He seeks better vocational opportunities for the pupils.
5. He looks for better instructional materials from the pupil's work.
6. He secures information for better vocational guidance.
7. He tries to encourage school attendance by employer contacts.
8. He looks for possible employment situations for future use.
9. He arranges time for the pupil's classwork so that it detracts least from the work.
10. He secures information for moral guidance.
11. He secures reports for case histories.
12. He secures information for educational guidance.

These twelve items are arranged in order of importance as determined by the votes of both teachers and experts in part-time education. Table III shows this data in compact form.

TABLE III. Showing Vote on Importance of Certain Activities in Employer Visitation in Percentages

Activities	*Very Important*	*Important*	*Not Important*
1. Securing better understanding of pupil's work.			
Total Teachers	*70*	21	3
Total Experts	*83*	8	0
2. Interpreting part-time-school law.			
Total Teachers	*67*	27	13
Total Experts	*83*	8	8
3. Securing better co-operation of employers.			
Total Teachers	*89*	10	2
Total Experts	*75*	8	8
4. Secure better vocational opportunities.			
Total Teachers	*87*	8	8
Total Experts	*75*	8	8
5. Securing instructional materials.			
Total Teachers	*54*	34	10
Total Experts	*67*	25	8
6. Secure information for vocational guidance.			
Total Teachers	*67*	23	8
Total Experts	*66*	25	8
7. Encouraging school attendance.			
Total Teachers	*76*	17	6
Total Experts	*50*	33	17
8. Discovering possible employment situations.			
Total Teachers	*49*	40	7
Total Experts	*58*	42	0
9. Arrange time for pupil's classwork.			
Total Teachers	37	*44*	13
Total Experts	*42*	42	8
10. Secure information for moral guidance.			
Total Teachers	*50*	30	14
Total Experts	25	*50*	25
11. Get reports for case histories.			
Total Teachers	31	*34*	24
Total Experts	17	23	*42*
12. Secure information for educational guidance.			
Total Teachers	*56*	27	13
Total Experts	8	*67*	25

According to the opinions of both teachers and experts, the securing of a better understanding of the pupil's work is the most important single activity of the co-ordinator. Seventy per cent of the teachers and 83 per cent of the experts give this item a rank of very important, 21 per cent of the teachers and only 8 per cent of the experts rank the item as important, and only 3 per cent of the teachers and none of the experts indicated that it was not important to the success of co-ordination.

The interpretation of the part-time-school law ranks

second in the list of twelve items, so far as importance is concerned. Sixty-seven per cent of the teachers and 83 per cent of the experts gave this activity a rating of very important, while 27 per cent of the teachers and 8 per cent of the experts gave it a rating of important, and 13 per cent of the teachers and 8 per cent of the experts indicated that the item was not important.

The third item of importance in co-ordination of the school and shop is that of securing better co-operation from the employer. This co-operation is of paramount importance when the good of the institution is being considered. The co-ordinator is the one who is most influential in securing this good will and co-operation. The item is given a rating of very important by 89 per cent of the teachers and 75 per cent of the experts. It is given a rating of important by 10 per cent of the teachers and 8 per cent of the experts, and it is given a rating of not important by only 2 per cent of the teachers and 8 per cent of the experts. The teachers place this item first in the list so far as importance is concerned, while the experts rank it third. Evidently teachers feel the need of this co-operation more keenly than do the experts who do not come in such close contact with the pupils.

The securing of better vocational opportunities is given fourth place in the list of items by the experts but second by the teachers. Here, again, the teachers reveal a little closer contact with the pupil and the community problem. Eighty-seven per cent of the teachers and 75 per cent of the experts give this item a rank of very important, 8 per cent of the teachers and 8 per cent of the experts give it a rank of important, and 8 per cent of each group give it a no-importance rank.

Securing instructional materials as a result of the visits to the places of employment, ranks in the first six items. Teachers would place it in the eighth place, while the experts give it a fifth-place rank among the twelve items. In other words, teachers have ranked the activity as very important by 54 per cent and the experts by 67 per cent. It was given a rating of important by 34 per cent of the teachers and 25 per cent of the experts, and a rating of not important by 10 per cent of the teachers and 8 per cent of the experts. In one sense, there is a discrepancy on this point, since it is a part of curriculum service which ranks first among the seven major activities performed by co-ordinators.

Securing information for vocational guidance is also among the first six activities connected with employer visitation. Sixty-seven per cent of the teachers and 66 per cent of the experts rated the item as very important, 23 per cent of the teachers and 25 per cent of the experts rated it as important, and 8 per cent in each group rated the item as not important. Good co-ordination is evidently concerned with the problem of securing information for vocational guidance as a part of employer visitation. Experts and teachers agree almost perfectly on their rating of this item.

Although there is general agreement between the teachers and experts on the importance of the factors in employer visitation, it is not absolute. Teachers, for instance, have placed sufficient emphasis on the attendance of pupils to place it in the first six items, while the securing of instructional material, the thing on which one would expect teachers to place the greatest emphasis, would fall into the second six items. On the other hand, the experts place the item of securing information for educational guidance painfully low.

The second list of six items or activities performed by co-ordinators is: (1) the encouraging of school attendance; (2) the discovering of possible future employment situations; (3) the arrangement of the pupil's class time with the employer; (4) the securing of information for moral guidance; (5) the securing of reports for case histories, and (6) the securing of information for educational guidance.

The ranking of the items is based upon the judgment of the experts who have rated the item as very important, important, or not important. Table III gives the material in tabulated form for the reader's study.

In practice, as will be shown later, the encouragement of attendance of pupils upon school is the most important activity of the co-ordinator in his visits to either the home or the employer. When the activity is rated by the experts in the field, it is sixth in importance in employer visitation, and fourth in home visitation. Teachers place it first in home visitation and third in employer visitation. In other words, 76 per cent of the teachers and 50 per cent of the experts rank the item very important, 17 per cent of the teachers and 33 per cent of the experts rank it as important, and six per cent of the teachers and 17 per cent of the experts feel that the activity is not important in co-ordination work. On this point, the theory and the practice do not seem to correlate.

The discovering of possible employment situations was ranked very important by 49 per cent of the teachers and 58 per cent of the experts, it was ranked important by 40 per cent of the teachers and 42 per cent of the experts, and not important at all by 7 per cent of the teachers and none of the experts. Evidently the matter of employment has not been considered very seriously or the votes have been influenced by the fact that many schools have special employment agencies. In such cases, this item would not be considered part of the co-ordination work.

The adjustment of the pupil's class time to suit the employment situation falls ninth in the list of activities of the co-ordinators according to the votes of the experts. Thirty-seven per cent of the teachers and 42 per cent of the experts rank the item as very important, 44 per cent of the teachers and 42 per cent of the experts rank the item as important, and 13 per cent of the teachers and 8 per cent of the experts rank the item as not important. From the employer's point of view, as revealed in conferences, both teachers and experts have underestimated the importance of this item. Much of their hearty co-operation is dependent upon this adjustment.

The securing of information for moral guidance is ranked very important by 50 per cent of the teachers and only 25 per cent of the experts; it is ranked important by 30 per cent of the teachers and 50 per cent of the experts, and unimportant by 14 per cent of the teachers and 25 per cent of the experts.

Although case histories would seem to be very important only 31 per cent of the teachers and 17 per cent of the experts rated it very important, 34 per cent of the teachers and 23 per cent of the experts rated it as important, and 24 per cent of the teachers and 42 per cent of the experts rated the item as not important.

From the evidence at hand it seems that one cannot expect to secure information for educational guidance by visits to the employers and to the shops. Experts are more of this opinion than the teachers, as is revealed by the following: 56 per cent of the teachers ranked the item very important, while only 8 per cent of the experts gave it this rating; 27 per cent of the teachers thought that it was important, while 67 per cent of the experts gave it this rating, and 13 per cent of the teachers and 25 per cent of the experts felt that the activity was not important.

Although, there is some general disagreement as to the relative values of certain activities in co-ordination between the school and the employer, there is a very close correlation generally.

Placement Service

The problem of finding employment in a city without the aid of some central agency is very difficult indeed. As the years pass and industrial and occupational life becomes more specialized, the problem increases. Employers do not care to be called upon by an unselected group of work hunters.

They prefer using some agency which has some selective ability. It saves the time of employers and renders larger service to the community. The problem of placing juvenile workers is even more difficult than the placement of adults. It involves selection of employment which looks much more to the future. It involves a knowledge of the employment and the possibilities of immature individuals. In view of the fact that the school knows more about the youth and his possibilities, it would appear to be the logical institution to direct his employment. It is also becoming more evident that the school knows more about the occupational life of the community than any other institution.

Theoretically, the public schools have had contact with the juvenile workers for a period of eight to ten years before they venture an occupational career. During this time, much has been discovered about the abilities and the habits of these boys and girls. No other agency becomes so intimate with the youth as the school. No other agency tries so clearly to relate the child to his vocational and civic environment as does the school. To increase this knowledge and render a larger service to the vocational world, is becoming one of the motivating aims of the schools at large, and especially the continuation schools. Therefore, it would seem that placement service should be lodged in the hands of the continuation school or at least the public schools of the country.

Six factors are involved in successful placement service. These activities in order of importance are: (1) making community surveys to discover placement or employment opportunities; (2) helping place pupils in the right jobs; (3) changing and replacing the misfits; (4) making surveys for the purpose of discovering new and better instructional materials; (5) making trade agreements with employers, and (6) making job analyses for instruction, placement, and follow-up.

The making of community surveys to find employment opportunities is given the highest rank by experts, and the second highest rank by the teachers of any single item on the list. Seventy-six per cent of the teachers and 83 per cent of the experts gave the item a rating of very important, 16 per cent of the teachers and 8 per cent of the experts rated it important, and 6 per cent of the teachers and 8 per cent of the experts rated the item as not important. Making these surveys seems rather important in successful placement service, and it is so considered by both teachers and experts.

TABLE IV. Showing Votes in Percentages on Certain Placement-Service Activities of Co-ordinators

Activities	*Very Important*	*Important*	*Not Important*
1. Making community surveys to find employment opportunities.			
Total Teachers	*76*	16	6
Total Experts	*83*	8	8
2. Helping place pupils in right jobs.			
Total Teachers	*77*	10	2
Total Experts	*75*	17	8
3. Replacing the misfits on the job.			
Total Teachers	*64*	20	3
Total Experts	*58*	42	0
4. Making surveys for instructional materials.			
Total Teachers	44	*47*	7
Total Experts	*58*	33	8
5. Making trade agreements.			
Total Teachers	31	31	16
Total Experts	*42*	17	*25*
6. Making job analyses for placement and follow-up.			
Total Teachers	*40*	31	14
Total Experts	33	*42*	*25*

The second most important activity that the co-ordinator is called upon to perform in his placement service, is helping place the student in the right job — right both from the point of view of remuneration and futurity of the job, and of the pupil's ability to succeed in the employment. Teachers would place this item first in the list of duties of co-ordinators so far as placement service is concerned. In other words, 77 per cent of the teachers and 75 per cent of the experts rated the item very important, 10 per cent of the teachers and 17 per cent of the experts gave it a second-place rating while only 2 per cent of the teachers and 8 per cent of the experts rated it as not important.

Replacing the misfits in employment is the third most important activity of the co-ordinator in his work as placement officer. Sixty-four per cent of the teachers and 58 per cent of the experts rated the activity as very important, 20 per cent of the teachers and 42 per cent of the experts rated the item important, while only 3 per cent of the teachers and none of the experts thought that the duty was not important.

Next in importance is making surveys for the securing of instructional materials so that the pupil may be better fitted to his employment. This is one of the means by which the pupil is helped to succeed in his work. Forty-four per cent of the teachers and 58 per cent of the experts rated the item as very important, 47 per cent of the teachers and 33 per cent of the experts rated it important, and 7 per cent of the teachers and 8 per cent of the experts rated it as not important.

It seems that this work involves the making of trade agreements in many instances. This is not considered a very urgent duty of the co-ordinator since only 31 per cent of the teachers and 42 per cent of the experts thought that the service was very important; 31 per cent of the teachers and 17 per cent of the experts thought that it was important, while 16 per cent of the teachers and 25 per cent of the experts thought that this was not an important duty of the co-ordinator.

Making job analyses for placement and follow-up was not rated very high as a function of co-ordination service. It may be that the question was misunderstood since it did not mention the place of instruction in the analyses. At any rate, 40 per cent of the teachers and 33 per cent of the experts felt that the item was very important, 31 per cent of the teachers and 42 per cent of the experts considered it important, and 14 per cent of the teachers and 25 per cent of the experts rated the item as of no importance in the co-ordination service.

On the basis of the above data, one would conclude that all six of the activities mentioned are of sufficient importance to be carried on if co-ordination service is at its best. Where specialized placement officers are employed, all of the activities might well be taken over by that office even though it might well belong to co-ordination.

Community Services

When community service is considered among the functions of co-ordination, it ranks very low. It would seem advisable for co-ordinators to mix with the people of the community in order that a better understanding of the environment could be secured. However important this might appear to the outsider, it does not impress either the teacher or the expert in continuation work so forcefully. Of the four different activities mentioned in this list, only one was given a rating of very important, and that by a rather weak vote. The four items suggested in this connection as significant activities for co-ordinators are: (1) the securing of co-operation of community clinics; (2) the attending of community meetings for the purpose of securing closer personal contacts; (3) helping in community service for closer contacts for the school, and (4) rendering miscellaneous community services.

Securing the co-operation of community clinics is rec-

ognized by both teachers and experts as rather important, since 49 per cent of the teachers and 50 per cent of the experts rated it very important; 29 per cent of the teachers and 42 per cent of the experts ranked it important, while 8 per cent of each group rated the item as of no importance. This is the only item in the list which received the rating of very important.

The attending of community meetings to secure closer personal contacts was given a rating of very important by 37 per cent of the teachers and 35 per cent of the experts.

TABLE V. Showing Votes in Percentages on Certain Community Services of Co-ordinators

Activities	*Very Important*	*Important*	*Not Important*
1. Securing co-operation of community clinics.			
Total Teachers	*59*	29	8
Total Experts	*50*	42	8
2. Attend community meetings for personal contacts.			
Total Teachers	37	*43*	17
Total Experts	35	*50*	17
3. Help in community service to get close contacts.			
Total Teachers	33	*50*	14
Total Experts	25	*67*	8
4. Render other community services.			
Total Teachers	24	*34*	33
Total Experts	8	25	*42*

The item was given a rating of important by 43 per cent of the teachers and 50 per cent of the experts, and a rating of not important by 17 per cent of each group.

Actually helping in community service was rated very important by 33 per cent of the teachers and 25 per cent of the experts. It was rated important by 50 per cent of the teachers and 67 per cent of the experts, and not important by 17 per cent of the teachers and 8 per cent of the experts.

The fourth item, rendering other community services, was given a rating of very important by 24 per cent of the teachers and only 8 per cent of the experts. It was ranked as important by 34 per cent of the teachers and 25 per cent of the experts, and as not important by 33 per cent of the teachers and 42 per cent of the experts. Evidently this is not recognized as a very well defined duty of co-ordinators.

In all, there is a very close agreement as to the relative importance of all four of the items listed under this heading. It is considered only an important function so far as the entire service is concerned.

(To be continued)

Elementary Architectural Drawing

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The primary objective of architectural drawing in junior high schools should be directed first toward developing appreciations, and second, toward the acquiring of vocational-guidance facts.

THE courses in elementary architectural drawing of a junior-high-school level, should have a tendency to deal with appreciations and community values rather than with the aspect of trade and vocational training. It is hoped that the knowledge and appreciation gained will be reflected on the future home-building choice and construction.

Objectives

1. To develop and fix an understanding of simple home building and construction.
2. To give experience in home planning.
3. To be able to recognize, and know something of building materials, locations, and desirable home types.
4. To stimulate interests in the desire for better homes and better construction.
5. To give the pupils an insight into the possibilities of architectural drawing as a profession or vocation.

Construction of Course

1. Experimental work in cardboard and wood in constructing small-scale models of simple details.
2. Lecture and experimental work co-ordinated.
3. Work in drawing to be co-ordinated with classes in home economics and art.
4. Related readings from architectural magazines to accompany classwork.

Instructional Procedure

1. Models are quite necessary for effective teaching. Scale models of the simple details of cornices, windows, roof, and sill construction, together with entire scale-model houses are valuable teaching aids. In addition, materials of construction, house plans, blueprints, and perspective photographs, should be included as part of the necessary equipment. The instruction should be of interest to the student, and, of course, within his scope.
2. Visits should be made to completed and partially completed houses.
3. Visits should be made to homes that have been properly landscaped.

Time Allotment

Three hours a week for nine or ten weeks should be devoted to this work.

Information to be Gained

1. Knowledge of building materials.
2. Knowledge of simple floor plans and elevations.
3. Knowledge of correct use of architect's scale.
4. Knowledge of the type of home most suitable for the existing conditions.
5. Knowledge of how to beautify the home.
6. Knowledge of lot locations and sizes.
7. Knowledge of the language of the architectural draftsman.
8. Knowledge of the value of shrubs, grass, and landscaping to the home.
9. Knowledge of the requirements demanded by the profession, training needed, demand for services, salaries, phases of the work, and opportunities for advancement.

Derivation of Skills

1. To read and write with a fair degree of skill, the language of industry.
2. To plan and draw simple floor plans.
3. To recognize the suitable home for a given lot in a given community.
4. To place art in home creation.
5. To recognize home values and estimate costs.
6. To use and understand the architect's scale.

Appreciations

1. To be able to recognize the value of a well-planned home in a community.
2. To strive for art and beauty in home exteriors and interiors.
3. To create a love for the better things of life.
4. To appreciate the value of landscaping.

Development of Traits and Habits

1. To plan carefully.
2. To visualize.

3. To develop initiative and self-reliance.
4. To create better things.
5. To do things in the best possible way.
6. To think carefully.

Related Information

I. *History of Home of Man*
II. *Modern Homes*
1. Value to community
2. Types
3. Cost
4. Size
5. Taxes
III. *Building Materials*
1. Lumber
2. Brick
3. Stone
4. Plasters
5. Stucco
6. Sand
7. Cement
8. Roofings
9. Nails
10. Hardware
11. Insulators
12. Metal Lath
13. Sash, Doors
IV. *Planning a Home*
1. Size
2. Lot
3. Climatic Conditions
4. Drainage
5. Room Conveniences
a) Electrical outlets
b) Closets
6. Kitchens
7. Built-in Appliances
8. Fireplaces
9. Closet Room
10. Bath
11. Plumbing
12. Basement Room
V. *Care of Home*
1. Painting
2. Repairs
3. Lawns
4. Shrubbery
VI. *Shopwork*
1. Simple floor plans
2. Layout of rooms
3. Simple constructions
4. Simple architectural lettering
5. Free-hand sketches on squared paper of floor-plan possibilities
6. Simple details of various common construction of windows, sills, cornice, and roof construction

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The New Industrial Arts Metal—III

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The third and last of these articles on aluminum describes some of many diversified applications of aluminum and the aluminum alloys.

IN 1879, a young American purchased a pair of opera glasses from a Parisian jewelry establishment. The jeweler had offered to mount the glasses in either aluminum or platinum for approximately the same price. Aluminum had taken Paris by storm, and to Deville, a French chemist, the world at large looked for the latest developments in aluminum. Influenced, too, by smart Parisians who remembered the regal days of Napoleon III and his enthusiasm for the metal, it was only natural that the young man should have decided to have the opera glasses mounted in aluminum.

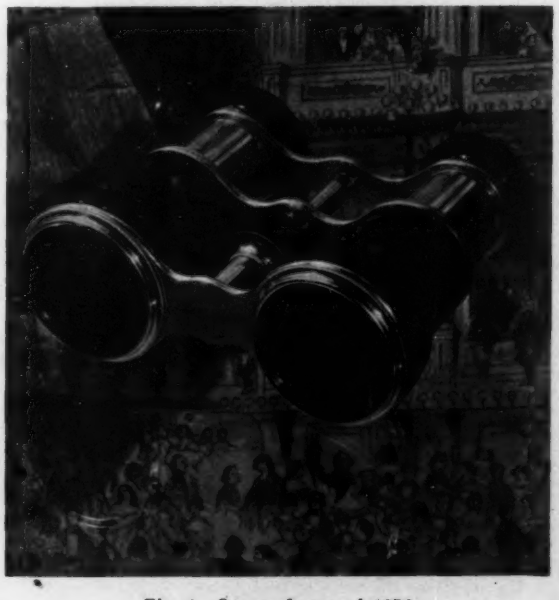

Fig. 1. Opera glasses of 1879 mounted in aluminum

As subsequent events have proved, his choice of aluminum was most unwise. The price of platinum has increased materially while the price of aluminum, today, is but a mere fraction of its 1879 level.

The discovery, in 1886, of the electrolytic process for the manufacture of aluminum by Charles Martin Hall, made possible a material reduction in the price of the metal and placed it in a position where it could compete with the common commercial metals. Emphasis should, however, be placed on the word *could*, for the mere fact that Hall developed a process whereby aluminum could be produced economically was not sufficient to make aluminum a common commercial metal.

Silver, today, sells for about the same price that aluminum sold for in 1886. If, tomorrow, a method were announced for the production of silver at a price where it could compete with iron, copper, lead, zinc, and aluminum, the silver producers would find themselves in a position similar to that which the aluminum manufacturers faced in the early nineties. There would be large stores of silver on hand and no one would know what to do with it.

Then markets for silver would have to be created just as markets for aluminum had to be created when its price dropped to a point where it could compete with the everyday metals of commerce. There would be dreamers, no doubt, visioning silver this and silver that, just as the pioneers in

the aluminum industry spent many a day picturing aluminum buildings pointing skyward and aluminum trains racing across the country. In time, however, these grandiose dreams would begin to fade away like a mirage and the realization would begin to dawn that markets cannot be created overnight. As one old-timer in the aluminum industry put it: "No matter what you have to offer, it takes a vast amount of study and ingenuity to fit it into the world's needs, and an unbelievable amount of persistent argument and shoe leather to sell it."

As a cub among commercial metals, aluminum was an extremely hardy infant, for, from the outset, it has been endowed with chemical and mechanical properties which make it useful in many different fields of engineering endeavor. The Hall process had not long been in use when it was realized that the light weight of aluminum, its good heat conductivity, its nontoxic qualities and ready workability would make it ideal for cooking utensils. As a result, it can be said that the aluminum industry was practically born in a teapot some forty-odd years ago. The story of aluminum cooking utensils since then is well known, and, today, more than 350,000,000 aluminum pots and pans have been made in the United States — enough to supply every household with an even dozen!

The metal's usefulness to the housewife has extended into many other fields. Vacuum cleaners made chiefly of aluminum are easy to operate because of their lightness. Washing machines are built of aluminum because of the metal's excellent resistance to corrosion; and its good conductivities for heat and electricity are taken into account in the construction of electric flatirons, mangles, waffle molds, and grills. A stool or chair fabricated of aluminum will help brighten the kitchen; while aluminum furniture in the living room, dining room, or den will give the house a decidedly modern atmosphere.

Following closely on the heels of the development of the aluminum cooking utensil comes the use of the metal in the transmission of electrical energy. Aluminum possesses 61 per cent of the electrical conductivity of copper, and for equal resistance in unit length, it must have a cross-sectional area 59 per cent greater. But even with this increase in cross-section, the aluminum conductor will weigh 52 per cent less. As a result of this saving in weight, aluminum wire may be stranded around a high-strength steel core to produce a conductor with comparative lightness and high mechanical strength. This type of conductor is known as aluminum cable, steel reinforced, and is the most common form of aluminum conductor. A large amount of the metal is employed in electrical conductor busses in the form of bars, tubes, and channels.

Even before the discovery of the Hall process, aluminum received its baptism in the architectural field. It was in 1884 that Col. William Frishmuth, of Philadelphia, made a 100-ounce capstone casting for the Washington Monument, and, at that time, it was the largest piece of aluminum cast in any country. Last year, when the Washington Monument was cleaned, the capstone casting was thoroughly examined by metallurgists from the Bureau of Standards who found it to have been substantially unaffected by the atmospheric conditions in Washington for the past 50 years.

Architectural aluminum details were exhibited at the World's Fair in Chicago in 1892; and the metal was used for elevator enclosures, stair railings and grilles in a number of the outstanding buildings of the nineties. It was then, however, that the red and yellow metals predominated and it was not until architectural design called into play the lighter-colored materials that aluminum came into its own as an architectural metal.

In this new order of things, and with a definite economic trend taking place in architectural design and construction, aluminum offered the architect many interesting possibilities.

Fig. 2. Airplanes constructed of the strong alloys of aluminum daily speed across the country

Its lightness reduced erection costs; its high degree of non-corrosion and non-drip-staining qualities eliminated many items of maintenance from cost consideration; while the large number of different forms in which aluminum could be obtained, made it possible to design the entire structure from the same material.

The adaptability of aluminum to modern architecture is well exemplified in many of today's buildings. Some of the more prominent structures include: The Empire State Building, New York, with its aluminum spandrels, store fronts and mooring mast; the buildings of the Rockefeller Center Development, New York, with their aluminum spandrels, windows, and ornamental trim; the Marshall Field Building, Chicago, with its aluminum spandrels and windows; the Research and Engineering Building of the A. O. Smith Corporation, Milwaukee, with its aluminum and glass façade; and the Cincinnati Union Terminal in which all of the interior metal work is of aluminum.

The transportation industry each year consumes by far the largest percentage of aluminum produced in this country. Without becoming involved in physics, the reason for this is concisely expressed in the formula, $E = \frac{1}{2} mv^2$, in which E is the net energy, exclusive of friction, which must be delivered to a vehicle of mass m, at rest, so that it will attain a velocity v. (The mass of the vehicle is equal to its weight divided by the acceleration due to gravity, or $m = \frac{w}{g}$.) Since aluminum is the lightest of all the metals commonly employed in the transportation industry, it makes possible a material reduction in the weight of the vehicle and hence in the mass, and with this reduction in mass, there is a corresponding reduction in energy. Again, if the energy is held constant, the velocity can be substantially increased by reducing the mass.

For many years, the automobile industry was one of the largest single users of aluminum. In recent years, however,

Fig. 4. Six-car Union Pacific Streamliner that broke all existing records for transcontinental rail travel in October, 1934. Built of the strong aluminum alloys, the train weighs only 210 tons or approximately 500 tons less than a train of orthodox design fabricated from the heavier materials

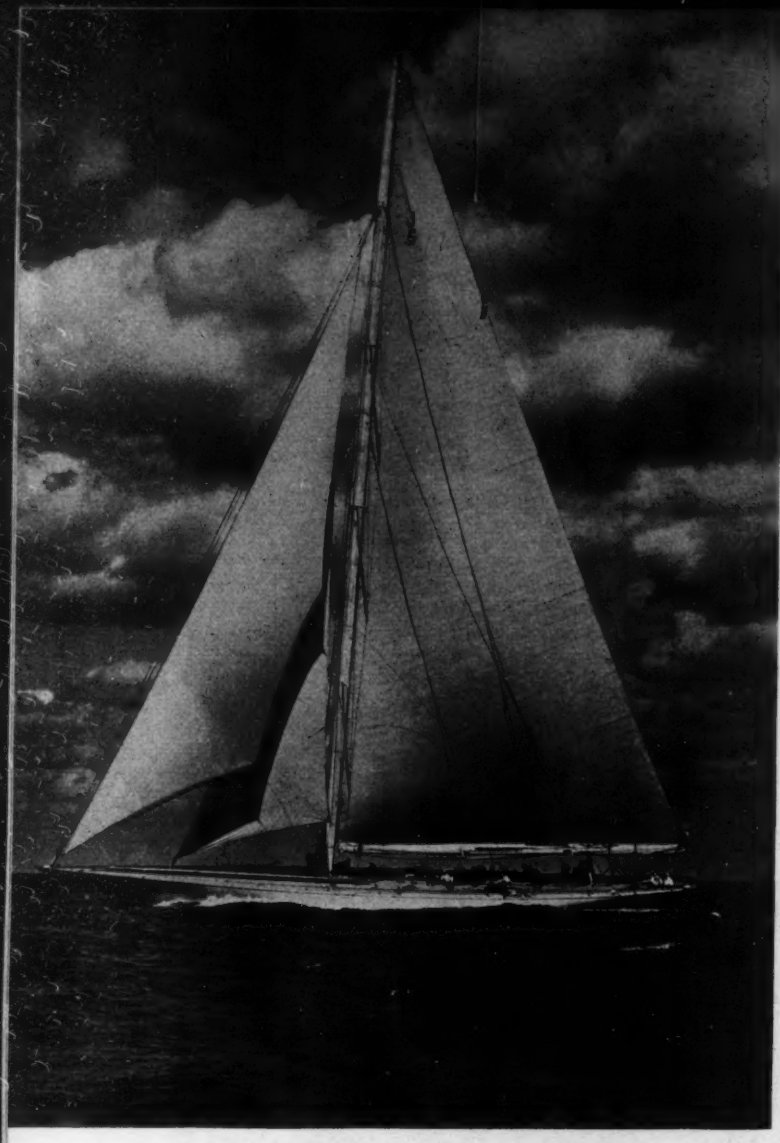

Fig. 3. The successful defender of America's Cup, Rainbow, is equipped with a light-weight aluminum-alloy mast

price competition has changed the entire picture in the pleasure-car field, except in the higher-priced cars, and aluminum, today, is used only for such vital parts of the power plant as the pistons and cylinder heads.

In the case of trucks and busses, there is an entirely different story. While price competition is equally as keen as in pleasure cars, the operator considers more than the initial price of the truck or bus. The economies involved in operating the vehicle are generally the determining factors, and, when they are taken into account, it is found that the ultimate cost of an aluminized unit is lower than that of one fabricated from the heavier materials.

The saving in dead weight resulting from the use of aluminum may be applied directly to the pay load without any increase in gross load or, if an increase in pay load is not essential, the decrease in dead weight results in improved schedule speeds, less wear on the chassis and tires, and lower fuel consumption.

The railroad and electric street railways were even quicker to grasp the full significance of weight reduction than were the operators of trucks and busses. Shortly after the world war, it was found that the weight of rolling stock had mounted to such an extent that it was beginning to affect not only motive power, but operating cost and maintenance of equipment, permanent way, and structures. Since the aluminum alloys had demonstrated their durability and adaptability for aircraft construction during the war, it was only logical that transportation engineers should carry on with a metal which even at that time had meant so much to the aircraft designer.

The first organized effort toward lightening railroad rolling stock with the use of aluminum came in 1923, when the Illinois Central System built 25 suburban cars with aluminum applications. From this meager start, there has been a progressive development in the use of aluminum to decrease the dead weight of railway equipment, and today more than 2,300 cars have been aluminized. At first, the cars were built partially of aluminum; then came the all-aluminum car; and last year, the Union Pacific placed in operation the first all-aluminum train.

While the active development work on railroad rolling stock has been centered in passenger equipment, the need for light-weight freight equipment will in turn be equal to, or greater than, the need for light-weight passenger equipment. Advantage has already been taken of the chemical and physical characteristics of aluminum in the construction of tank cars used in the transportation of foods and chemical products which could not be transported in ordinary tank cars without contamination. Sulphur and sulphur compounds have no effect on aluminum. As a result, the use of aluminum in hopper-car construction makes possible a light-weight hopper car ideally adapted to the transportation of sulphur and soft coal. A number of these cars have been in use for more than two years and several eastern railroads are actively considering the aluminum hopper car.

Every metal has at least one industry in which it has won special recognition. In the early days, the public commonly associated aluminum with the cooking-utensil industry and, while aluminum continues to be one of the outstanding materials from which cooking utensils are fabricated, the use of this metal in the construction of both lighter- and heavier-than-air craft has become more common. Practically all of the military and transport planes are of aluminum construction.

The application of aluminum in the marine field is not so well known as are the uses for the metal in other branches of the transportation industry, although the weight limitations placed upon naval vessels, as well as the recent fires aboard passenger vessels, have focused greater attention on the use of this metal and has caused the adoption of increasingly larger amounts in ship construction. The use of aluminum in smaller craft for such things as masts for dinghies; the bollards, cleats, hand rails, and other fittings for motor launches; the fuel and gravity tanks for pleasure cruisers; and in the hull construction of a number of recently built vessels, has influenced its use in larger ships. That the application of aluminum for larger craft is entirely feasible is exemplified in the construction of the partitions in the passenger quarters of the *Normandie*, the world's largest ship, and its use for similar purposes in the vessels of many of the leading powers.

While the cooking-utensil, electrical-conductor, building and transportation industries, account for approximately 70 per cent of the aluminum used, the applications of this metal extend into practically all branches of industry, and only a few of the many diversified applications for aluminum can be mentioned by way of illustration.

Because of the large variety of color finishes which can be successfully applied to aluminum and because of the versatility of the metal itself, aluminum has been extensively employed for packaging many different types of commodities. Aluminum foil is used in the packaging of candy, chewing gum, cheese, tea and coffee, photographic film, cigarettes, and numerous other items; while aluminum collapsible tubes are employed for an equally large number of products, such as tooth pastes and shaving creams, paints, solders, petroleum

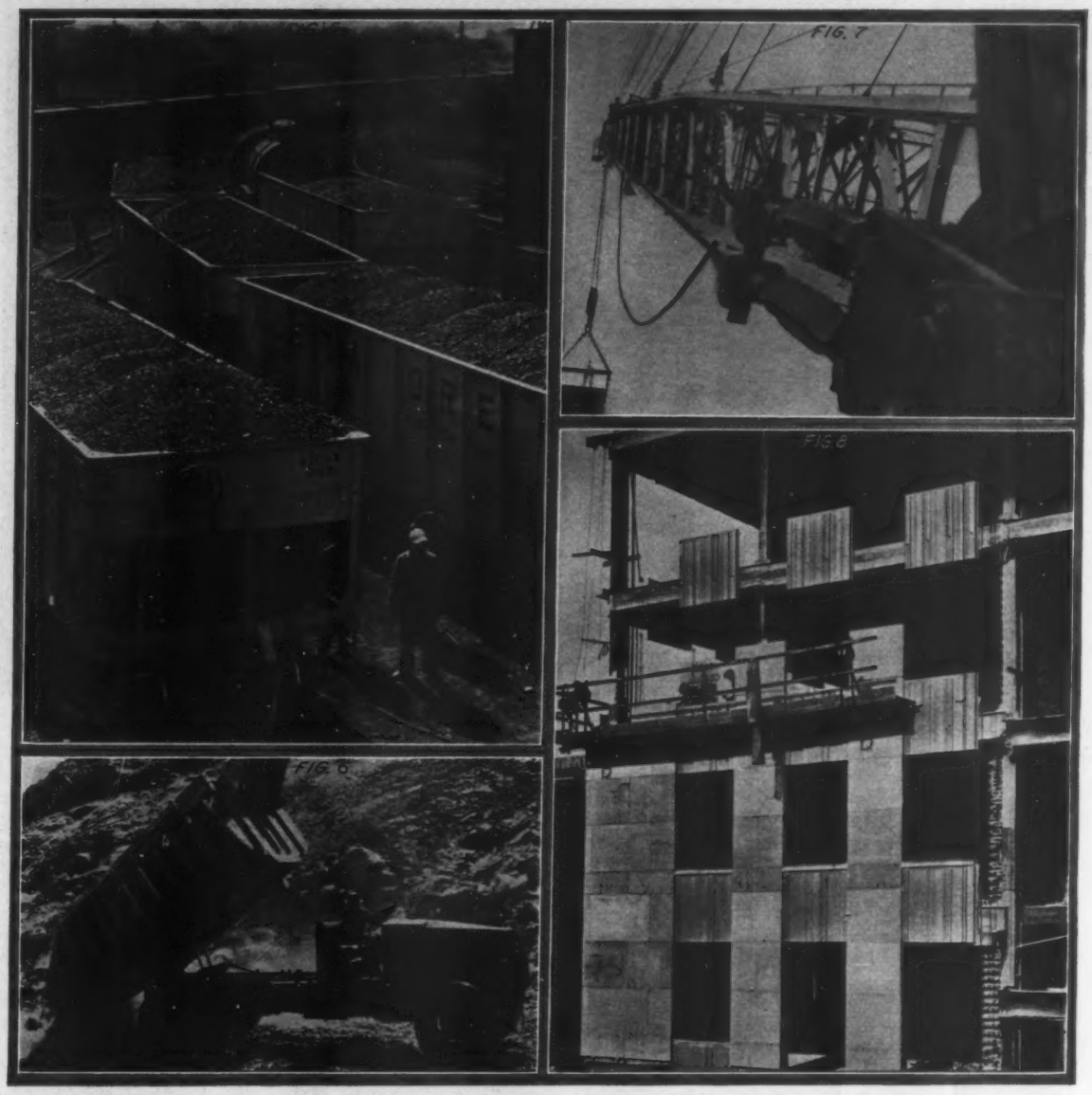

Fig. 5. Sulphur and soft coal have no harmful effect on the aluminum bodies of these 70-ton hopper cars. Because aluminum was used in their construction, they are 10½ tons lighter than ordinary hopper cars of similar design. Fig. 6. A 25-ton dump truck, when built of aluminum, is light on the dead load but heavy on the payload. Fig. 7. Dragline booms have greater reach as a result of the light weight of aluminum. Fig. 8. Construction of one of the buildings in the Rockefeller Center Development, showing the erection of aluminum spandrels

products, and medicinal supplies. Frequently, cold cream and other cosmetics are marketed in aluminum containers. Aluminum caps and seals serve packagers in many industries, including food, liquor, drug, cosmetic, and petroleum.

The repeal of the Eighteenth Amendment brought about a revival in the use of aluminum in the brewing industry. Well suited by nature to the requirements of a brewery, aluminum is today employed for fermenting tanks, wort coolers, yeast utensils, brew kettles, storage tanks, dispensing coils, and related equipment. In the distribution of beer, the lightness and strength of aluminum make it useful for beer barrels.

Attractive appearance, ease of cleaning, and the nontoxic properties of aluminum have resulted in a steadily widening sphere of usefulness for the metal in the dairy industry. In addition to its application in storage tanks, milk-truck bodies, milk cans, and in foil hoods for milk bottles, it serves in pasteurizing equipment for such items as coolers, balance tanks, filters, heaters, and piping.

Aluminum paint is utilized both in industrial and domestic fields. It is equally applicable for service on wood and metal, offering protection under all conditions. The protective ability of aluminum paint results from the tiny flakes of pure aluminum which make up the pigment portion. When the paint is brushed or sprayed over a surface, many of these flakes rise to the top of the paint to collect in a metallic film and are held there by surface tension. This phenomenon is called "leafing." Together with the underlying layers of flakes scattered throughout the vehicle, this metallic film offers resistance to the passage of both moisture and the destructive ultraviolet rays of the sun.

The ability of structural aluminum to withstand hard knocks and severe service has been proved in the performance of the metal in dragline excavators used in mining

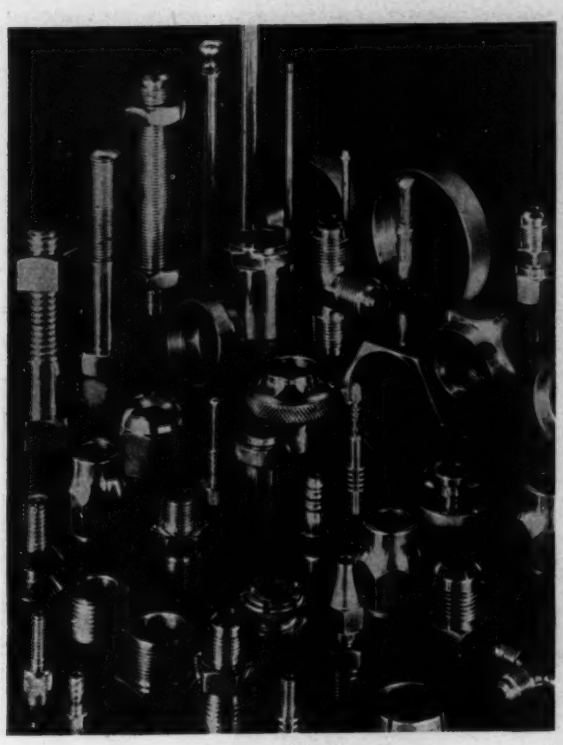

Fig. 9. Aluminum screw-machine products

Fig. 11. The Smithfield Street Bridge, Pittsburgh, being reconstructed with a strong aluminum alloy floor system. The 8-in. aluminum cambered channel the man is carrying is 21 ft. long

coal in Pennsylvania, in the irrigation projects in the West, and in building levees on the Mississippi River. Booms constructed of aluminum make possible a 15 to 20 per cent greater reach and increase the capacity of the bucket 20 to 25 per cent without affecting the mobility and stability of the excavator.

Overhead traveling cranes, constructed of the strong aluminum alloys, weigh 25 to 60 per cent less than those constructed of the heavier materials. They are used chiefly in buildings with long runways or in buildings with cantilever roofs. Again, when it is desired to increase the capacity of a crane without reinforcing the support for the runway, the aluminum crane has a definite application. It also proves advantageous in chemical plants in which the fumes and vapors are particularly harmful to the heavier materials used in crane construction.

Fig. 10. Navy and Marine Memorial, Washington, D. C., erected to honor all who serve their country on the sea. It is cast in aluminum

The year 1933 witnessed the first major use of aluminum in bridge structures. During that year, the Smithfield Street bridge, an important highway and electric street-railway bridge in downtown Pittsburgh, was reconstructed with a strong aluminum-alloy floor system. The use of aluminum in this instance was to some extent an outgrowth of the depression. The bridge was 51 years old and the city engineers were concerned about its safety. If money had been readily available, they possibly would have replaced the entire structure with a new one, but in 1933, money was by no means easy to obtain. As a result, the floor system for the two 360-ft. spans of the bridge was reconstructed in the strong aluminum alloys, and since the light weight of aluminum made possible the elimination of 750 tons dead weight, the equivalent of the normal peak live load on the bridge, the life of the bridge has been pro-

Fig. 12. Aluminum collapsible tubes are employed in the packaging of many different types of commodities
Fig. 13. Aluminum foil preserves the original freshness and flavor of candies

longed at least 25 years. The cost of reconstruction was $370,000, while the cost of a new bridge would have been in the neighborhood of $2,000,000; and for the next 25 years, the taxpayers of Pittsburgh will save about $70,000 each year as a result of the proper use of a material for a specific purpose.

Laughed at in the nineties for their prophecies about aluminum, many of the pioneers in the aluminum industry have watched the metal's phenomenal rise and have seen a large number of their dreams fulfilled. What the future holds for aluminum, no one knows. Its versatility has been established, and its diversity of forms and applications has prompted many to predict even greater things for the metal. As for the young man who purchased the opera glasses, his son recently told the writer that long ago his father had concluded that nothing was impossible.

Questions for Discussion

1. Explain why price reduction alone was not sufficient to make aluminum a common commercial metal.
2. What industry consumes the largest amount of aluminum? Why?
3. Two contractors agree to move 10,000 tons of coal for $1 a ton. Working conditions make possible six payload trips per day per truck. Each contractor employs two trucks at an operating cost of $25 per day per truck. The gross load weight for the trucks of both contractors is the maximum permitted by state legislation, but one contractor decides to use trucks with aluminum bodies since he can haul six tons of coal per trip, while the other contractor, whose trucks have bodies fabricated from heavier materials, can haul but five tons per trip. The aluminum truck bodies, however, cost $525 per truck more than the trucks of the second contractor. Was it a wise choice to use a more costly material in this instance? How much did each contractor make?
4. Besides light weight, what other properties of aluminum are particularly advantageous in the construction of hopper cars and tank cars?
5. Why is aluminum employed for cooking utensils?
6. What properties of aluminum influence its use in architecture?
7. Name some of the commodities you buy that are packaged in aluminum foil, collapsible tubes and containers, or in bottles capped with aluminum seals.
8. When speaking of aluminum paint, what is meant by "leafing"?
9. Explain why aluminum is a versatile metal.
10. Name the uses for aluminum or places in which the metal could be employed in your home.

Foreign Wood Carving—II

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This is the second article on the author's study of wood carving taught in foreign schools.

IN ATTEMPTING to make a detailed study of wood carving as taught in the schools of foreign countries during the past few years, some unusual facts presented themselves. It appears, for instance, that there is no wood carving taught in the schools of China or Japan. This seems to be out of harmony with the fact that these countries excel many others in the carved work which they produce. It is true that the wood carving in these oriental countries is so unlike that

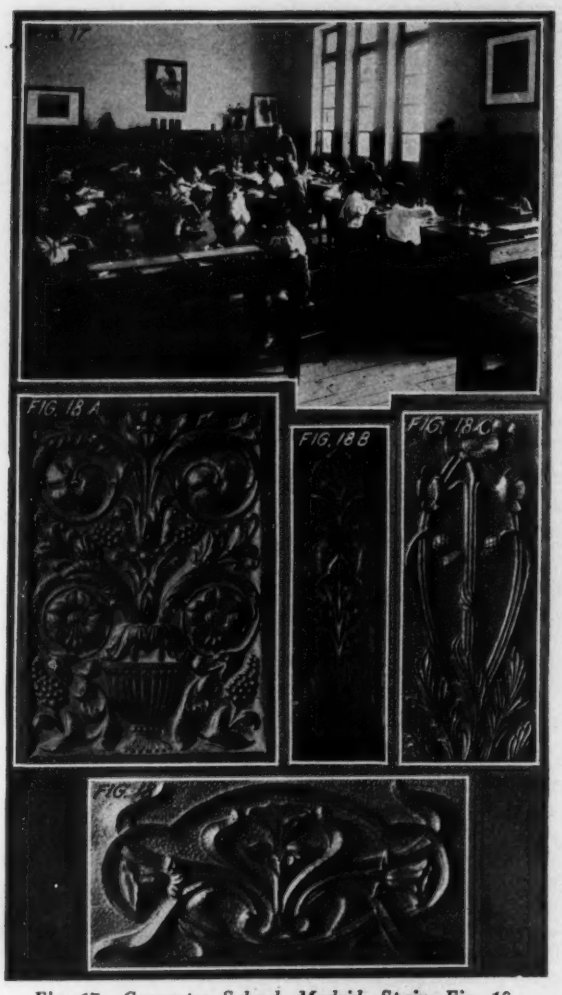

Fig. 17. Cervantes School, Madrid, Spain. Fig. 18. A, B, C, D, pictures from schools in India

of other countries as to form a distinct contribution to the art. The headmaster of the schools at Kumamoto, on the island of Kysushu, Japan, writes:

I regret to inform you that there is nothing I can contribute to your study of wood carving in the schools of Japan. In Japan the wood carving is one of the oldest of its arts, and though you will find immense age-old idols and statues, and, too, beautiful carvings about the temples, new and old, you will not find it taught anywhere in the schools. It is too bad indeed. Elementary woodworking has been with us the past few years, being introduced into a very few schools, but along the line you desire information, there is none to give. Those who learn wood carving are apprentices sitting at the feet of masters in special shops, not schools.

With the exception of China, Japan, and the countries of South America, Central America, and Mexico, practically all the rest of the principal countries of the world teach some form of wood carving in their schools. Our own Indian school in Ketchikan, Alaska, of which Leonard Allen is principal, has a class of twelve boys in totem carving. All the countries of Europe appear to teach wood carving, if not as a regular course, at least as a special handicraft, or art course. India seems to rival even the northern European countries in the extent to which carving forms a part of the curriculum in the special schools.

The work is often taught in the primary schools to very small boys. Figure 17 shows a class of 30, ages from 11 to 13 years, in the Cervantes School of Madrid, Spain. It will be noted that these boys are working with standard, full-sized carving tools.

In this article we shall present a series of studies, for the most part in relief work, as done in the schools of the various countries. In our next article we shall take up carving in the round, a type of work which is very beautifully done in many countries, but of which we have very little as yet in our schools.

In Figure 18 we have some work from India, each an excellent style of medium-relief carving. This work is under the direction and control of Director of Industries, Bombay, India. Each of the pieces shown is an example of a conventionalized natural form. This style of carving perhaps reached the height of its excellence in the fifteenth century, being an adaptation from the faithful portrayal of natural forms by the artists of the thirteenth century. This style of carving creates and sustains interest by a certain rhythm secured by repetition, balance, and harmony. This is very apparent in each of the pieces shown in Figure 18. One thing apparent in the work of the students in the schools of India is the *finish* of the work with rasps and by sanding, leaving no trace of the tool marks on the finished surface. While this refines the work, it does away with the appearance of vigor and spontaneity, so earnestly sought by some wood carvers. The piece shown at A in Figure 18 was made by a student in the Carpentry School in Allahabab. The one shown at B was made by the students in the Government School of Carpentry, Lucknow. Those shown at C and D, were made in the Woodworking Institute at Bareilly, U. P., India.

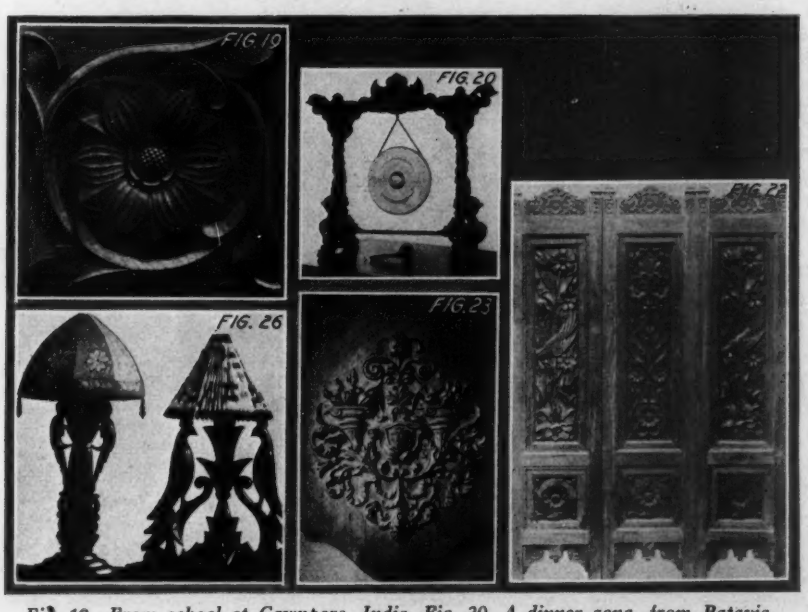

Fig. 19. From school at Cawnpore, India. Fig. 20. A dinner gong, from Batavia, Dutch East Indies. Fig. 22. From School of Carpentry, Lucknow, India. Fig. 23. From Technical School, Kingston, Jamaica. Fig. 26. State Technical School, Poland

The schools of India do a wide variety of work, as will be seen as this series of articles progresses. The piece shown in Figure 19 was

Fig. 21. Three pictures from a school in Paris, France

Fig. 24. Plaque from Doylesford Technical School, Victoria, Australia. Fig. 25. From School of Carpentry, Lucknow, India. Fig. 27. From Graz, Austria. Fig. 28. Triptych from Manilla, Philippine Islands

carved in the school of Cawnpore. It is included here because it is such a clean-cut piece of work, with a very well worked out floral motif. Teachers will find this a very useful model.

Among a list of over 1,000 photographs of wood carving in the schools of foreign countries, it becomes a question of which ones to select for use in this series of articles, since it is evident that but comparatively few can be shown. The piece shown in Figure 20 is a little piece of work from Batavia, the capital of the Dutch East Indies. It shows a distinct Chinese influence. The dragon motif is used and worked out in much intricate detail. Since a considerable percentage of the inhabitants of Batavia are Chinese, it may be that this dinner gong was the work of a Chinese boy. The illustration is included because it represents a very unusual piece as compared to the regular work of the schools.

The three pieces of medium-relief carving shown at A, B, and C, in Figure 21 were made by students of the *École Boulle*, Paris, France. So far as the writer's information goes, this school excels all other schools in this type of illustrative carving. In galleries and on exhibits one can occasionally see this type of work as done by Gilbert Bayes — work of much vigor of execution and pronounced relief. The piece shown at B, Figure 21, is particularly good in execution. The treatment of the muscles and facial expression in C also is very good for work of this type. A is evidently intended for an advertising plaque. These pictures were received from the Minister of National Education, France.

Figure 22 shows a piece of work from the Lucknow School, India. It is included in this article to show how work similar to that in Figure 18 can be worked out into a useful and beautiful piece of furniture. The screen shown in Figure 22 is of unusual beauty, and it is rich with suggestions for similar work in our own schools.

The exceedingly well-balanced and well-executed panel shown in Figure 23 is the work of the students in the Technical School, Kingston, Jamaica. The background, being entirely cut away and carefully finished, tends to give the impression of "applied work." It is a good rule never to cut the background entirely down to one level, but to leave an edge or a frame of the original wood as high as the carving. This does away with the rather unnatural effect to which some would object in this work.

The virile and rugged piece pictured in Figure 24 was done in Daylesford Technical School, Victoria, Australia. This piece very well illustrates what we said above about leaving the border as high as any other part of the figure. Contrary to the method followed in India, the tool marks in this piece of work are sanded or rasped away, thus leaving the edges of the wood to suggest the strength of the material. This gives a very pleasing suggestion of vigor in expression. The

piece shown is a very well worked out piece of most pleasing design, and was done in Honduras mahogany.

Figure 25 shows a piece of pierced-work carving done in the schools of Lucknow, India. This is a fine example of design drawing. One does not have to do very much carving to arrive at the conclusion that fine carving is more in the drawing than in the work. The best wood carver is also an artist. In our evening schools for adults, those who have had some art training soon advance beyond the mere craftsmen in wood. Pierced-work carving should not be confused with jigsaw work; the design of the carving is just as carefully modeled as if the background were left intact.

Figure 26 shows two carved lamp bases from the State Technical School, Poland. This work is of rather unusual design. They are, however, very small night lamps such as are kept dimly burning in halls, and as such would, doubtless, be rather pleasing in effect. Poland does some splendid work in full-figure carving, as we shall see in the next article in this series.

Figure 27 shows a splendid piece of work of unusual boldness of execution made by a student in the Technical School at Graz, Australia. This school was founded in 1914 and has over 1,000 students. The frankness with which the tool cuts are left on the work and the entire absence of attempt to produce a fine smooth finish add materially to the value of this work and help to carry the idea of strife and conquest.

Figure 28 is undoubtedly the finest and best executed piece of work I have yet been able to collect. It was made by a Filipino art student and the picture was obtained from Gilbert S. Perez, Superintendent of Vocational Education, Manilla, Philippine Islands. This carver, evidently also a finished artist, was able to do what is often found impossible in wood, that is, give all the expression of a painting to carving in wood. It will be noted that the draping of the garments, the curl of the hair, and the facial expressions are as natural and perfect as though painted on canvas with a brush. Notice how carefully the detail of every part is worked out. This picture will reward careful study. It was made for the central panel of a triptych, and is carved in a native wood — molave, one of the hardest of the Philippine woods.

Accessories for the Archer

W. Ben. Hunt

Handcraft Instructor
Boy Scout Troop 98, Hales Corners, Wisconsin

If archery is to be thoroughly enjoyable, the archer must be equipped with a few additional articles besides his bow and arrow. The making of these additional things is described in this article.

The Bracer

NOW that the archer has a bow, a string, and some arrows, he may feel that he is ready to try them out. Before doing this, however, he will need a few more things. The most essential of these is the bracer or arm guard. The slap of a bowstring on the forearm is painful, to say the least. The skin is frequently broken, and a nasty bruise results. Coat or sweater sleeves will break the blow, but they also deflect the arrow. To avoid injury, therefore, one should have a bracer, such as is shown in Figure 87, made of stiff, smooth leather, or of a thin piece of wood. For the leather bracer, buy a piece of heavy calfskin at a harness or shoe shop. This must then be cut to shape as shown in Figure 88, and equipped with straps and buckles, or laces. If zippers such as are obtainable at the 5- and 10-cent stores are used, the leather should first be fitted to the arm. See Figures 89 and 90.

Fig. 87

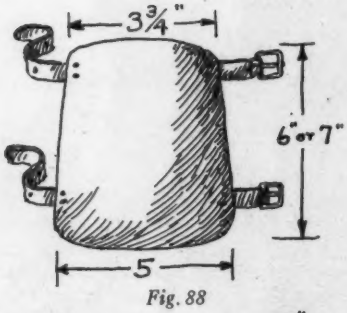

Fig. 88

Fig. 89

Fig. 90

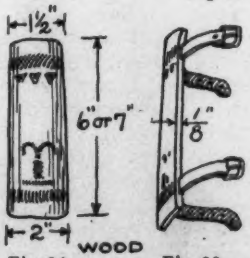

Fig. 91 *Fig. 92*

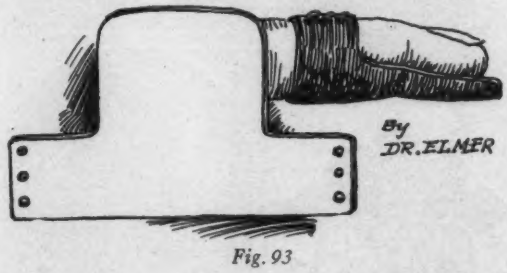

Fig. 93

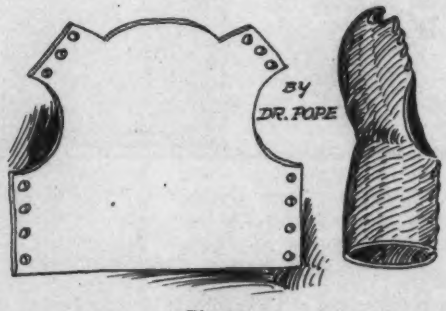

Fig. 94

The wood arm guard, Figures 91 and 92, should be rounded to fit the forearm. The edges also should be rounded. The wood should be about ⅛-in. thick, 1½ to 2 in. wide, and 6 or 7 in. long. These arm guards are equipped with straps fastened with rivets or with glue into grooves cut for them. See Figure 92. After sanding, wood bracers should be decorated with water colors, after which several coats of spar varnish should be applied, rubbing down each coat with steel wool.

Finger Stalls

If the archer has tough fingertips, he can shoot in comfort. As a rule, however, a covering for the tips of the three shooting fingers is quite necessary when doing a lot of shooting, or when using a heavy bow. Dr. Elmer, in his book *Archery*, and Dr. Pope, in his *Hunting with Bow and Arrow*, both show what they consider proper finger stalls. Their suggestions are shown in Figures 93 and 94.

These stalls should be made of calfskin or horsehide, or, lacking that, take leather from an old shoe.

Another method of protecting the fingertips is to put strips of ½-in. medicated tape along the fingers as shown in Figure 95. Gloves are used by many archers, some using a regular archer's glove while others take an old glove and cut away the unnecessary portions as shown in Figure 96. To prevent excessive wear, reinforce the tips of the fingers in these gloves with leather.

Fig. 95

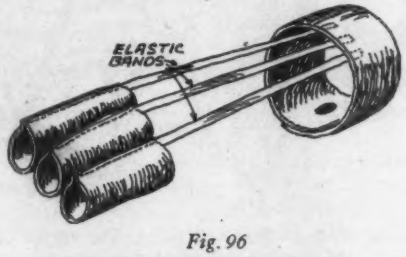

Fig. 96

The Quiver

A quiver is also very essential and there are many ways in which it may be made. The Indians made them of rawhide or buckskin, and sometimes used an entire fox or coon, or woodchuck skin with the fur, feet, and tail all left on. Figure 97 shows such a quiver. When making a quiver of leather or skin, or of any material for that matter, it is well to make the bottom of some soft wood to prevent pointed arrows from piercing the material. If leather is not at hand, use canvas. Paint it several coats and then ornament it with colored paints.

Paper mailing tubes make serviceable quivers. Get one of the lighter kind, anywhere from 2 to 4 in. in diameter, and after fitting a piece of wood into the bottom, fasten it with a row of nails tacked all the way around. See Figure 99. The length of the quiver should be such that about 1 in. of the arrow shaft shows below the feathers. The feathers should never touch the quiver.

Quivers made of a mailing tube should be given a few coats of shellac inside and outside. To shellac the inside, pour some into the open end of the quiver. Then revolve and tip it gradually, until the entire inner surface is covered. After the shellac is dry, cover the outside with dark oilcloth, auto-top material, or leatherette. This is fastened into place with

Fig. 97

Fig. 98

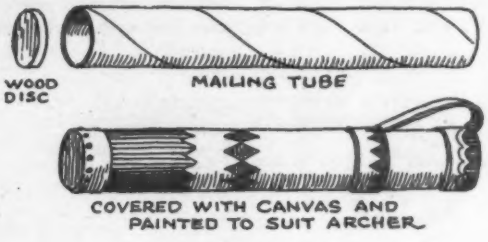

Fig. 99

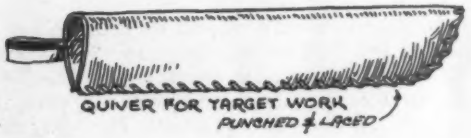

Fig. 100

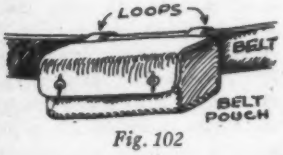

Fig. 102

Fig. 101. Bow case

Fig. 103

Fig. 104

glue. Attach loops to the quiver as shown in Figures 98, 100, and 101, and suspend it from a belt. It is best to use a separate belt and not hang it on the one used to hold up the trousers. The quiver should hang from the right hip, somewhat toward the rear. The separate belt is advisable because in going through the wood and brush, the position of the quiver must be changed frequently. An archer who is left-handed, of course, will carry his quiver on the left side. For target work where only six arrows are used, a small flat

quiver made of leather or a small mailing tube is all that is necessary. Such a quiver is shown in Figure 100.

The archer who wants to carry his bow along on auto tours or camping trips, will want a bow case to protect the bow while it is in transit. A nick in the back of a bow may mean a broken bow. Bow cases usually are made of canvas or of duck. They should be waterproofed and made a little longer than the bows for which they are intended so that the end may be lapped over and tied, or pulled up with a drawstring. See Figure 101.

The archer should also have a place to carry a few extras, such as an extra bowstring, some wax, an oiled rag, extra tips, etc. These may be carried in a leather case fastened to the belt as shown in Figure 102, or to the quiver, as shown in Figure 104, or the buckskin pouch shown in Figure 103 may be suspended from the quiver belt.

The Target

Having finished all his equipment, the archer will want something to shoot at. Regular straw targets may be purchased from dealers in archery equipment. They are made of rye or wheat straw about 4 in. thick and 4 ft. in diameter.

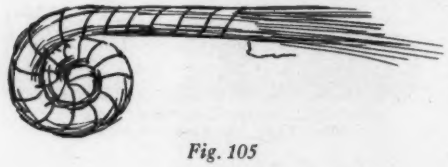

Fig. 105

They can be made at home if one has the necessary rye or wheat straw, marsh hay, or dried bullrushes. Such a straw target is made in much the same manner as that followed in making a grass table mat. The coils are made 4 in. thick, and they must be wrapped as tightly as possible with heavy cord. See Figure 105.

Keep adding material as you go along to keep the coil uniform. Continue until a length sufficient to make the 4-ft. circle. This may mean 40 or more feet of 4-in. coil. Then roll it into a tight spiral, using a heavy upholsterer's needle to sew the adjacent coils together as the spiral is formed. Then cover the whole target with burlap sewed around the edge. The face of the target shown in Figure 106 is painted on sized muslin or sign painter's cloth. Do not use enamels or gloss paints.

The gold counts 9, the red, 7, the blue, 5, the black, 3, and the white, 1.

Another target which is rather easy to make, but which is

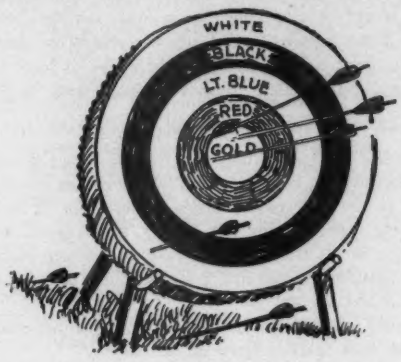

Fig. 106

not portable, is made of two bales of straw set at an angle as shown in Figure 107.

The frame for this type of target may be made of 2 by

Fig. 107

4-in. lumber or of 3-in. tamarack poles. The target face is then fastened to the straw with wood skewers. As this sort of target is out in all weather, it is well to provide a cover of some sort to keep off rain and snow, otherwise it will rot in a year or so.

Another form of target may be made of a 4-in. by 3 by 4-ft. carton of corrugated paper filled with straw or hay. Cartons of this kind may be obtained from printing establishments, as certain paper comes packed in them. A smaller target face will be necessary but it will be quite large enough to practice on.

Tests for Hand Fiber Weaving

Emil Gandre

Sheboygan Vocational School,
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A continuation of a set of tests which were started in the January issue of this magazine. A scoring sheet is added.

IN this informal industrial-arts test pertaining to hand weaving as applied to fiber furniture, Part III-A consists of 15 completion-type statements on braiding and the fastening of braids.

Part III-B consists of 30 completion-type statements on processes.

The scoring sheet will be found at the end of this article.

Part III-A — Completion Test (Processes)

Directions: Below are some incomplete statements. Place the proper words in the blank space, or spaces, to make the statement complete.

Example: A child loves to *play*.

1. When measuring the strands for a braid, they should be ..... than the part to be covered.
2. Always ..... the strands in the ..... before starting to braid.
3. After the braiding is complete, the ends should be ..... to prevent .....
4. To begin an 8-strand braid, place those strands in your ..... hand, ... those in the ..... hand.

5. The braiding of an 8-strand braid is done by using ..... strands at a time.
6. The braiding in any braid should appear .....
7. The braiding of a 12-strand braid is done by using ..... strands at a time.
8. Always nail the ends of a braid where they ..... be .....
9. The nails that hold the braid in place are spaced ..... apart.
10. In beginning to fasten a braid, place the first nail ..... in from the ..... end.
11. The ending of a braid is done by placing the ..... end ..... the closed end.
12. In most cases ..... nails are used to fasten the braid .....
13. A 1-in. surface can be covered with a ..... strand braid.
14. The braiding of a 15-strand braid can be done by using either ..... or ..... strands at a time.
15. The braiding of a 4-strand braid is done by using ..... strand at a time.

Score is based on the number right.

Score: .....

Part III-B — Completion Test

Directions: Below are a number of incomplete statements. Put the proper name or word in the blank space to complete the sentence. *Do not guess.* Each incorrectly marked statement counts as a penalty against you.

Example: In the summertime it is customary to wear a *straw* hat.

1. When fastening stakes on average-sized projects, the distance between the centers of each single or pair of stakes should be about .....
2. When doing plain weaving between two posts or stakes, an ..... number of stakes is necessary.
3. To weave between two posts or stakes a design such as a diamond weave, herringbone weave, or an arrow-check weave, ... number of stakes is necessary.
4. In the process of tying stakes, either ..... or ..... fiber can be used to hold them in place.
5. The procedure of fastening them in the tying process is begun from the ..... hand side of the project.
6. In the tying process, the stakes are held to the seat by ....., the fiber ....., the stakes, and ..... the seat dowel.
7. To fasten stakes with nails, hold the stakes in the ..... hand.
8. In beginning to weave a seat, a ..... stake is usually required in the .....
9. Whenever stakes are fastened with glue, they must be dipped into the glue to a depth of ..... before inserting them into the holes.
10. The kinds of stake holes are: ..... and .....
11. Concealed stake holes are found with an .....
12. In plain weaving, the strand always passes ..... a stake and ..... the next succeeding stake.
13. The ..... and ..... finger of the ..... hand are used mostly for weaving.
14. The ..... hand holds the woven strand in place when weaving to the right.
15. When weaving a strand through short stakes, the balance of the strand is ..... over the top ends of the stakes with the ..... of the ..... hand.
16. When stakes slant to the right in weaving, it shows that there is too much ..... on the strand.
17. To make an over-three cross fitch, it is necessary to have a ..... stake in the corners next to the posts. (Applying to fitching between two posts.)
18. The weaving of flat fiber around a stake is begun by placing the strand ..... the ..... hand stake.
19. A common veiling consists of ..... strands.
20. Bumpers for chairs, rockers or other projects, are begun from the ..... side facing the front of the project.
21. The flat fiber loops on a skirt weave are usually ....
22. The under-one over-two border is made by passing in ..... of the ..... stake to the right and in ..... of the next two stakes placing the end behind the stakes.
23. The term "over-two border" means passing in ..... of ..... stakes (either single or in pairs), and placing the end ..... the next succeeding stake.
24. An overcasting is also known as a ....
25. The term "cross-fitching" means the ..... of stakes.
26. In cross-fitching, both left and right stakes should have the same .....
27. The second and fourth strands of a 5-strand check are woven by passing in ..... of ..... stakes on both left and right sides of the center stake.
28. To begin a new row of checks, you must ..... the passing in front and back of stakes with the strands.
29. A roll-weave can be made either ..... or .....
30. To get an accurate shape in baskets, use a .....

The score is based on the number right.

Score: .....

Scoring Sheet

Part III-A

1. one-third longer
2. kink, center
3. tied, raveling
4. right, underneath, left
5. two
6. tight (uniform)
7. three
8. cannot, seen
9. 3 in.
10. 3 in. closed
11. open, underneath
12. ¾ in.
13. 8
14. 3, 5
15. 1

Part III-B

1. 1¼ in.
2. even
3. odd
4. flat, round (vice versa)
5. left
6. looping, over round
7. left
8. single, corners
9. ½ in.
10. visible, concealed (vice versa)
11. awl
12. over, behind
13. thumb, second, right
14. left
15. flipped, back, left
16. tension
17. single
18. underneath, left-
19. 3
20. left
21. cut open
22. back, first, front, fourth
23. front, two, behind
24. Soft fitch
25. Crossing
26. slant
27. back, two
28. alternate
29. full, half (vice versa)
30. form

Electrical apprentices assembling a 200-kva. generator after having rewound it for a local industry. State Trade School, New Britain, Conn.

INDUSTRIAL ARTS *and* VOCATIONAL EDUCATION

J. J. Metz, Editor

The Promotional Program

It is well, at the beginning of the new school year, to lay out carefully the promotional work which may be carried on for the year 1935–36. The past few years have shown conclusively that the school administrators, school boards, and the public at large, little understand why industrial-arts and vocational work ought to, and must, be made an integral part of the curriculum of the American elementary and secondary school. Since this is true, those interested in industrial arts and vocational education, be they teachers or supervisors, must hold themselves responsible for the promotion of a better understanding of this work. How best to accomplish this end depends upon many factors, not the least of which are the personality, ingenuity and ambition of the one planning the promotional work.

Since not everyone will be equally successful with every type of promotional work mentioned, it is necessary carefully to decide upon the type or types to be undertaken. Each one mentioned has been used successfully by different men in different places in acquainting their communities with the reasons which make it advisable, and necessary in our present civilization, to include industrial-arts work as a part of the general education of the youth of America.

Newspaper publicity, of course, is an old, tried method. Unfortunately, it is not used as much as it should be. The contact with most local newspapers is easily made, and the friendship once established with the editorial staff will do much in aligning the newspaper with the schools in any misunderstanding that may arise with the public.

One thing that the shop teacher who intends to make use of the newspapers for gaining publicity for his work should remember, is to get his supervisor, principal, or superintendent to sanction his material before it is published. Much ill-will and misunderstanding will be avoided if he adheres to this rule.

Another point to bear in mind is that the publicity should bring the work of the school to the foreground, and not consist of mere laudatory comments about the teacher. The value of the industrial-arts and vocational-education subjects and not the superiority of any one individual must be established by these newspaper articles.

If the foregoing must be observed when the publicity is carried by local papers, it is doubly important when such articles are published in national periodicals, for obviously the latter will do so much more harm if for some reason or other the plans of an individual miscarry.

Another proved method of gaining publicity is the exhibit, be it at the school, in stores, in public buildings, or before civic and other organizations. It is to be remembered, however, that an exhibit should not merely show projects, but should be permeated with the personalities of the students whose work is being shown, as well as the purpose for which the work was performed.

This may be done by showing the students actually at work; by giving full information about ages, grades, and previous contacts with the kind of work exhibited; and by showing in clear-cut statements, the objectives for which the work of the students, whose projects are exhibited, is given.

Contests, too, have been successfully used for gaining acceptance in some communities for the industrial-arts and vocational-education work offered in the schools. Here, again, the contest must not obscure the purpose for which the work is being given in the school, or the student for whose benefit the work was added to the curriculum.

These contests are frequently held under the auspices of the local newspapers, but service clubs, industrial and commercial firms also can be approached to finance and manage them successfully. Of course, the school can do all this itself, but the interest developed by those who foster such contests is worth while developing, even though it might seem as if the school were relinquishing some of its prerogatives.

Club work fostered by the shop teacher or shop department frequently is a potent means of developing interest in the school shop. This work, just as other promotional work, may require the shop teacher to put in some extracurricular time. He will be fully repaid for his efforts, however, because the students who take up this extracurricular work are usually the best in their classes, and their companionship is worth the extra effort. Then, too, this close contact between teacher and students, especially out of school hours, presents opportunities for giving the boys excellent training in how they are to conduct themselves in public.

There are many types of clubs that may be conducted. To list them exhaustively is out of question in this editorial. Briefly, however, they may be divided into clubs for SPORTS — swimming, skating, hiking, fishing; SPORTS INVOLVING SHOPWORK — archery, boating, sailing; COLLECTING — rocks and minerals, philately; MODEL MAKING — boats, airplanes, engines; STUDY — trees and plants, aeronautics, mining, stagecraft; REPAIR AND MAINTENANCE — school shop, playground, stage scenery and properties; SHOP SUBJECTS — special cabinetmaking, electricity; HOME WORKSHOP — shop equipping, shop arranging, special home projects. The more persons contacted by this type of work, the greater its publicity value.

School-auditorium presentations also can contribute much in the promotional program. It is true that the publicity gained thus as well as by some of the other methods outlined may not reach the general public unless special efforts are made to accomplish this specific

result. Nevertheless, shop teachers should take full advantage of giving their work the benefit of this type of publicity. And much can be accomplished with it too — not only in the school itself, but before service clubs, PTA gatherings, and other organizations.

Properly conducted shop trips, too, may gain favorable publicity for the school shop. These trips show that the school has an interest in industrial and business procedure, but they can also be used so that industrial business executives become acquainted with the true aims of the work in the school shop. Incidentally, the shop teacher can learn many things on these trips that can be used in his course either as practical work or as related-subjects material.

Interest in the homecraft guild is another means which the shop teacher cannot afford to overlook if he wants to get his work in the school shop favorably accepted by his community. The men interested in these guilds are most ready to look upon shopwork in the schools with favorable eyes, and their friendship and understanding are worth cultivating.

In planning for next year's promotional work, it is well for each teacher to analyze his own inclinations, abilities, and strength. One will be more interested in this phase of promotional work, while another will be more attracted by another. The best thing, therefore, is to consider one's powers in connection with the various phases that enter into a good promotional program, and then inaugurate only those which can be carried through successfully. In this way, everyone can feel that he is doing the best he can for industrial arts and vocational education not only in the classroom but outside of school hours as well.

Safety in the Printshop

Bert Popowski

Printing Instructor, Central High School, Aberdeen, South Dakota

The subject of safety must not come first nor last, but always in the school printshop as in every other school shop.

RECENTLY, in a talk on printing before a city-service club, a prominent printer offered the suggestion that a small, select group of student pressmen be trained to handle the feeding of simple jobs on platen presses at high rates of speed. The object was, of course, to fit the student pressman for part-time jobs in commercial printshops.

Since presses in commercial plants are usually set far in advance of the speed at which school-shop presses are operated, the answer was a very definite and emphatic *No*!

The printing course at Central High School is based on four semesters of work in the shop. The first two semesters are devoted to the various problems involved in the composition and lock-up of jobs, and the last two to the intricacies of combining ink and paper with the set-up to produce a worthy press job. Shortage of press facilities is only one of the reasons which prevents all students from working steadily on press jobs during their fourth or even their third semesters.

When the time comes for the novice to have his first try at the press, a lift of blank cards is given him, the pins are set in the most advantageous position of feeding, and then the student is allowed to feed the cards through once with the press at a standstill.

Next, he is required to start the press properly, regulate it to the rate of speed which he requires, and again feed the lift of cards through. After he has become thoroughly familiar with this size of stock, he is given lifts of different sizes to feed. The proper setting of the gauge pins precedes the feeding of every card size.

At no time during these preliminary stages is the throw-off lever left on impression; nor is a form allowed to remain on the press. Beginning pressmen have been known to do strange things while in the grip of an ecstasy brought on by their being allowed to run a press.

A preliminary lecture classifies the three important items involved in elementary presswork; namely, the feeder, the press and the form, and the paper stock. Beginners are told that the feeder is most important. Under no conditions are they to risk their hands to save a portion of the machine or the form, nor must they risk the machine to save a few sheets of stock.

A choice list of the horrible results that many years of work have paraded before the instructors' eyes generally drives home the point that a platen press is a very dangerous and inconsiderate piece of machinery. It really carries a two-fold threat in that the pressman risks his hands twice, once when he feeds the sheet, and once when he extracts the printed piece.

Beginners are most apt to lose sight of the fundamentals of feeding and to "cut up" when they think that they have an appreciative audience. Whenever such a beginner is caught in the act, he is put on the "bread and water" diet of the printshop — sorting out accumulated pi. After a fortnight of this uninspiring work, plus a good verbal "dressing down," he is much less apt to risk his own or a fellow student's welfare.

Beginners are usually placed in charge of running the simpler press jobs. The press speed is set by the instructor and is left there until the student conclusively proves his readiness for an advance of pace.

Jobs that require two or more runs on the same side of the sheet are reserved for those students who have proved their steadiness and accuracy. This promise of presswork on more technical and difficult jobs is held out to the students who are most careful and conscientious in the handling of the presses, stock, and ink, and produces a select few that are trustworthy under all conditions.

Strict adherence to these rules has given the writer a record of six years of work with press and bindery students, marred by only one minor accident.

DEAD

Old man Manual Training's dead
But lots of folks don't seem to know it.
On our shoproom doors right now
Old-time labels do not show it.
But 'tis said by those who know
That he's laid at rest with "Sloyd."
So, in peace there let him lie
And not be constantly annoyed.
Principals, and others, too,
Making out the shop schedule,
Stick to old M.T. like glue,
Think it's written on each tool.
As for us, let's do our part
Trying to advance our art.
No matter what the name may be
It's just the same to you and me —
Cutting, planing, shaping, too.
Only object we've in view
Is working, waiting, finding, then,
Not idle terms, but useful men.

— *Orville Hayford*, Terrytown, New York

Problems and Projects

ARCHITECTURAL DRAWING
Test No. 6
Scoring Sheet

Ren Aton, Michigan City, Indiana

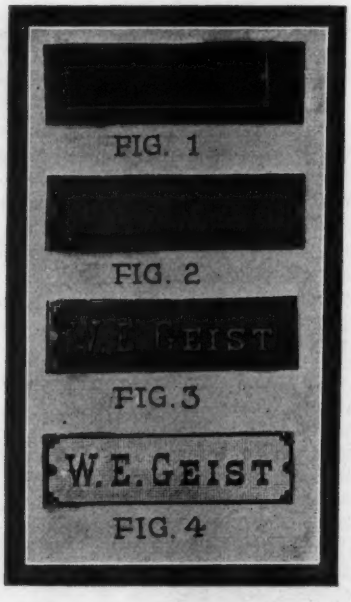
(See Supplement No. 316)

1. Second floor
2. Head room
3. Handrail
4. Baluster
5. Cove
6. Nosing
7. Tread
8. Riser
9. Stair well
10. String
11. Base
12. Floor joist
13. First floor
14. Newel post
15. Header
16. Ceiling joist
17. Wedge and housing
18. Header
19. Rise
20. Base shoe

MOLDING AND CASTING NAME PLATES

S. L. Coover and Jack Siren, State Teachers College, California, Pennsylvania

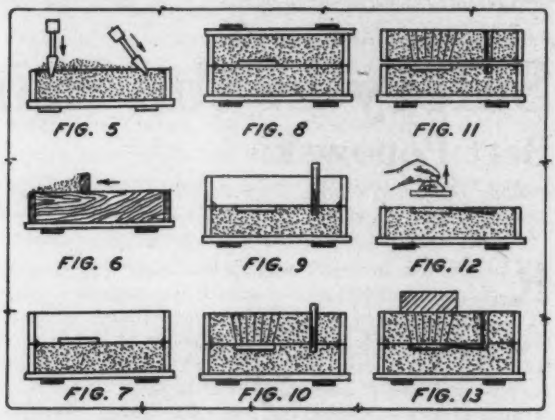
The casting of name plates is a very interesting school-shop project. The materials required are few and inexpensive. They can be made from odds and ends found around the shop. A few small flasks, a pail of molding sand (Albany 00), a pail of facing sand, a quart of parting compound, some scrap aluminum, a small crucible or ladle, and a molder's slick and spoon are the most important tools and materials required.



The master pattern, shown in Figure 1, on which the letters of any name or title are fastened, is made as follows: Shellac a section of coarsely woven curtain material or wire mesh — anything that will furnish an interesting background for the letters — to a piece of sheet iron approximately 1/16 by 3½ by 12 in. When the plate is dry, shellac some thin strips of wood ⅛ by 3/32 in. to make a frame of the desired shape and size. An outline or rectangle 2¾ by 9¾ in. is suggested, but any convenient size or shape may be used instead. See that the strips have a slight draft to facilitate lifting out of the sand. The outline may be improved by making use of decorative corner pieces cut from the same thin wood. Bosses for the fastening screws should be added to each end of the plate.

Ramming the Flask

First, fill the cope with tempered sand, ram, level off with a straightedge (Figs. 5 and 6), and smooth the surface with a trowel. Place the pattern face up on this surface, an inch



or so away from the center, as shown in Figure 7. Place the drag or lower half of the flask into position. Dust the pattern with a fine parting compound such as partomol; sift enough facing sand through a screen to cover the pattern, and fill with unscreened sand.

After ramming, scrape off the surplus sand and scatter a little loose sand over the surface for a good bearing. Place a cover board on the drag as shown in Figure 8, and turn the entire flask over. Lift off the cope and empty it. Smooth the surface around the pattern, and then replace the empty cope. Dust again with parting compound and put in a sprue about ¾ in. in diameter, an inch or so away from the middle of the pattern. See Figure 9. Sift some sand over the pattern; then proceed to fill and ram as before, being careful not to strike too hard. After the surface is leveled off, a number of vent holes are made by pushing a hatpin or piece of wire down through the sand until it touches the pattern, as shown in Figure 10. These vent holes allow the escape of air and steam when the mold is poured. Remove the sprue pin and enlarge the opening to a funnel shape with the finger. See Figure 11. Lift off the cope carefully and set it to one side. Apply a little water to the edge of the pattern with a camel's-hair brush. The pattern is now tapped slightly to loosen it from the sand and lifted up with a temporary handle made of wet, sticky clay, which is stuck to the back of the pattern as shown in Figure 12. Carefully blow all sand particles out of the mold. Replace the cope and place a weight on it. The mold is now ready for pouring. See Figure 13. Lead is suggested for the casting of this master pattern, but any metal may be used if it leaves a good surface and does not shrink too much. When the casting is cool, saw off the unnecessary projections and file the edges smooth. Remember to file a slight draft on all four edges. This master pattern, Figure 2, is now ready for the letters of any name or title.

Ordinary molding letters which can be secured in different sizes from any foundry supply house may be placed in position on the pattern as shown in Figure 3. Shellac is applied to the edges of the letters with a piece of wire. It runs underneath the letters, and when dry holds them securely. The

pattern is then ready for molding. The same procedure is followed as that in molding the first pattern.

Aluminum or zinc is suggested for the casting of name plates, but any metal may be used, depending upon the melting facilities and desires of the worker. When the metal is melted, but not too hot, it is poured into the mold in a small stream to give the air a chance to escape. If, after pouring, the mold sputters and emits large columns of steam, it shows that the sand is too wet, and the casting in all probability will be imperfect and full of holes.

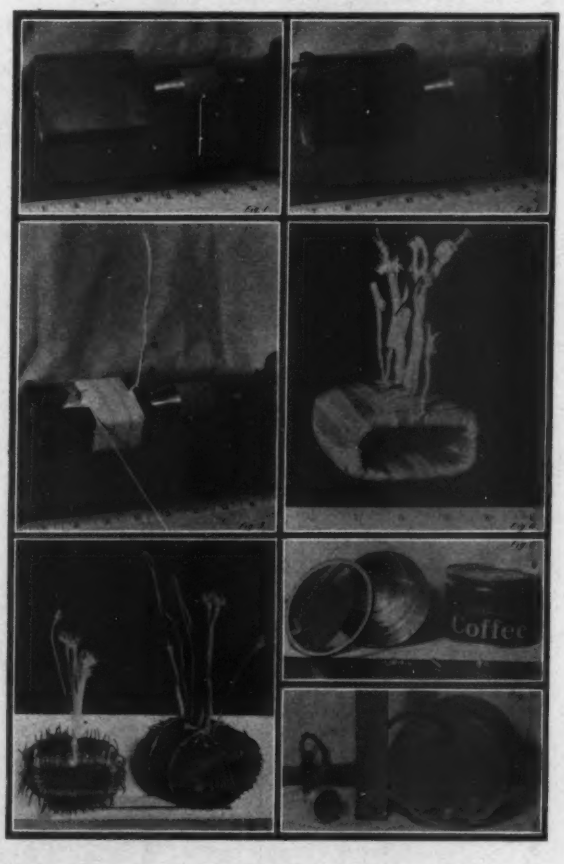
The edges of the plate are filed smooth and square. Drill screw holes in the bosses at each end, and countersink them. The plate is then fastened to a block of wood with small flat-head screws, and the block is clamped securely in a vise. File the surface of the plate with horizontal strokes until the border and letters are even. Smoother files are used until all scratches and marks are removed. The final polishing is done with a piece of wool after all the file marks have been removed with fine emery paper. The background may be painted a flat black to provide contrast if desired, but the satiny surface which remains after casting is very attractive. See Figure 4.

When the worker is familiar with this process of molding and casting, an unlimited field of experimentation is opened to him. Monograms, fraternity plaques, office signs, and any number of other objects may be made, all depending on his ability and originality.

A 50-WATT TRANSFORMER

Byron M. Taylor, Woodrow Wilson Junior High School, San Diego, California

The excellent 110-volt transformer herein described, may be used for toy electric trains, radios, bells, and many things requiring a low voltage. A particular advantage is that the novel core and case puts it within the range of most school-shop equipment. Furthermore, this project may be used as a vehicle for a great deal of basic and related information.



A 50-watt transformer

The first thing needed is the mandrel. This is a piece of wood ⅞ by 2½ by 3 in. with a ¼-in. hole bored through the long way. The mandrel spindle is a ¼ by 4-in. bolt placed through the mandrel and tightened with a nut. Both the mandrel and spindle are shown in Figure 1. They are held by a hand drill which is clamped in a vise.

Figure 2 shows the coil mounting, which is made of a piece of 3 by 7⅝ in. 20-mil. fish paper. Starting at a narrower side of the mandrel the paper is bent sharply to fit a corner, then pulled over a long side and marked for the next corner. Then it is removed from the mandrel and bent sharply so that it will fit tightly. This is continued for each corner all around. The paper is lapped over on the beginning side and glued. Be careful not to glue the paper to the mandrel. Next, tear some friction tape into long strips about ⅛ in. wide and wrap it about the paper as shown in Figure 2. This tape is used to hold the coil in place until a few layers of wire are on.

To start the primary coil, wrap about 360 ft. No. 24 s.c.e. magnet wire on a spool. This spool must be fastened several feet from the vise so that the wire can be unrolled. Now, push a 6-in. piece of No. 1 cotton sleeving over the end of the wire, as shown in Figure 3. Fold a 4-in. piece of cotton tape over the wire and sleeving, then lay them as shown in Figure 3. This wire must project at the end and center of the top side. Hold the tape and wire in place until a few turns are wrapped on, then the hand drill may be turned and the wire fed on. When one layer is on, count the number of turns, so that you may tell when you have a total of 550 turns on the primary. A piece of thin paper is wrapped around and between each layer.

When about half of the last layer is finished, lay another piece of tape, just the reverse of that in Figure 3, so that the loop is ahead of the coil and beyond where the last turn will come. Wind wire over this tape until the last turn has been reached. Push another piece of sleeving over the end of the wire, and thread wire and sleeve through the loop in the tape. Pull the tape ends so that the loop cinches both sleeve and wire, thus holding both tight.

Another piece of fish paper is wrapped around the primary coil, and then everything is ready for winding the secondary coil. This coil will also have 5 turns per volt. From this, one may get any desired voltage. Size and length of wire will depend upon the voltages wanted. As an example, suppose a 12-6-18-volt coil is desired. For the 12-volt coil about 40 ft. of No. 16 s.c.e. magnet wire will be required. Start this coil as was done with the primary, except that No. 2 sleeving will be used. Continue until about 60 turns have been put on. Leave a 4-in. end projecting and simply twist it to the end of the 6-volt coil which consists of about 30 ft. of No. 12 s.c.e. magnet wire. Continue winding and fasten the last end as with primary.

Figure 4 shows how the coils are bound and insulated with either ordinary cotton or impregnated Empire tape. Figure 4 shows a secondary with one more tap than described in the foregoing. The tape is next painted with an air-drying varnish, shellac, or with clear lacquer.

For the core, about 3½ lb. of No. 16 (steel wire gauge) double-annealed black iron wire will be required. Figure 5 shows one core in construction and another complete and bound with strong cord. Start on a narrow side, thread a piece of wire through the coils and bend it back around so that the ends of the iron lap over about ½ in. in the middle of the coils. Lapping in the middle makes the bulge conform better to the circular can which is to be used for the case. Put 4 layers on each narrow side. Next go to the top side and repeat the foregoing steps, except that the iron wire

ends should lap alternately on each end of the coils, thus giving a flatter top. Keep core wires ⅛ in. away from the coil leads on each side. Though not shown in Figure 5, one may drive some finish nails in from each end to take up the excess space, if there is not sufficient wire on hand.

For the case, an ordinary 1-lb. coffee can with its inner rim spot-soldered to the can proper, may be used. Figure 6 shows how the top is cut out of the can lid. The top of the case is a piece of 1/16-in. sheet fiber cut to the same diameter as the inside of the can lid. One ¼-in. hole and three 3/16-in. holes are bored in the fiber about as shown in Figures 6 and 7.

For the binding posts, use 3 No. 8 — 32 by 1-in. r.h. brass machine screws with hexagon brass nuts to hold the screws in the fiber. For holding connections to the binding posts, use 3 No. 8 — 32 winged thumb nuts, or the thumb nuts from some old dry cells (Fig. 6).

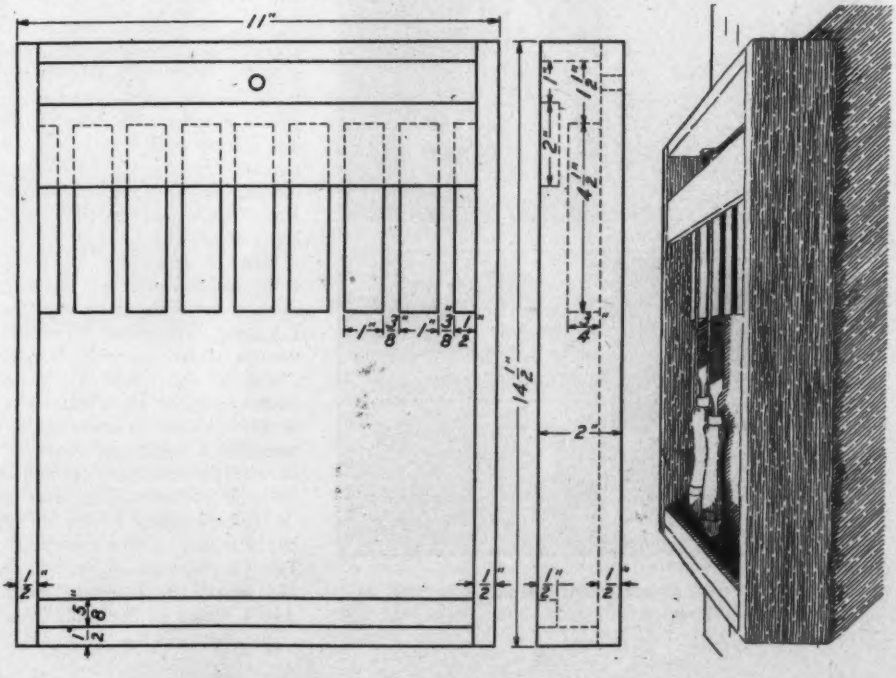
Solder the ends of the secondary to the heads of the screws, being sure that both wires of the twisted ends are soldered to one screw. Pass one end of No. 18 B & Y portable cord through the ¼-in. hole in the fiber lid. Tie an underwriter's knot in the cord or wrap friction tape about it to keep it from pulling out. Solder the ends of the cord to the ends of the primary coil and tape the splices. Put a layer of fish paper between the core and case top so that the screw heads will not touch the core and short the secondary. Put the screws through the holes in the fiber and place the lid and top as shown in Figure 6. If the core wires were not assembled tight and straight, the core may stick up too far for the lid to go on. If so, get another can like the one being used and cut it off about 1 in. from the bottom. Cut out the bottom as was done before and fasten the whole to the can in which the core is to be housed. This will give a lid that will have ample clearance. Wedge the core in the can with pieces of wood. Spot-solder the lid to the can, and the transformer is complete.

Although only one type of secondary is herein described, obviously, almost any type or voltage desired can be wound. Also, a slide-arm device could be arranged on the case top to give voltage changes quickly.

TOOLROOM TRAY FOR METAL FILES

Edwin M. Wyatt, Cleveland, Ohio

Because of its efficiency and merit, the file tray shown herewith has become almost standard equipment in the general metal and machine shops of the Cleveland schools, yet the writer has never seen it elsewhere. Its improvement over other trays consists in the two cross strips which insure that, no matter how carelessly handled, the tools will not spill out. It is sometimes made as a drawer in toolrooms having suitable cases, but more generally it is as shown, except as modified for different numbers or sizes of files. It can be hung on a nail in the toolroom or several will stack one upon another without much likelihood of spilling. The longitudinal separating strips keep the files from any possibility of dulling one another and makes checking them simple. The construction is simple. The tray shown is for eight 10-in. files, but modification for other numbers or sizes can readily be made.



No tools are more abused in the average toolroom than the files, but this tray protects them as they should be. A teacher who has used this tray will never go back to the makeshifts of hanging files by their handles, sticking them in notched blocks, or worse, piling them loosely in a box or drawer.

LARGE FISHING-TACKLE BOX

Harry W. Kroll, Independent School District No. 35, Buhl, Minnesota

General Directions

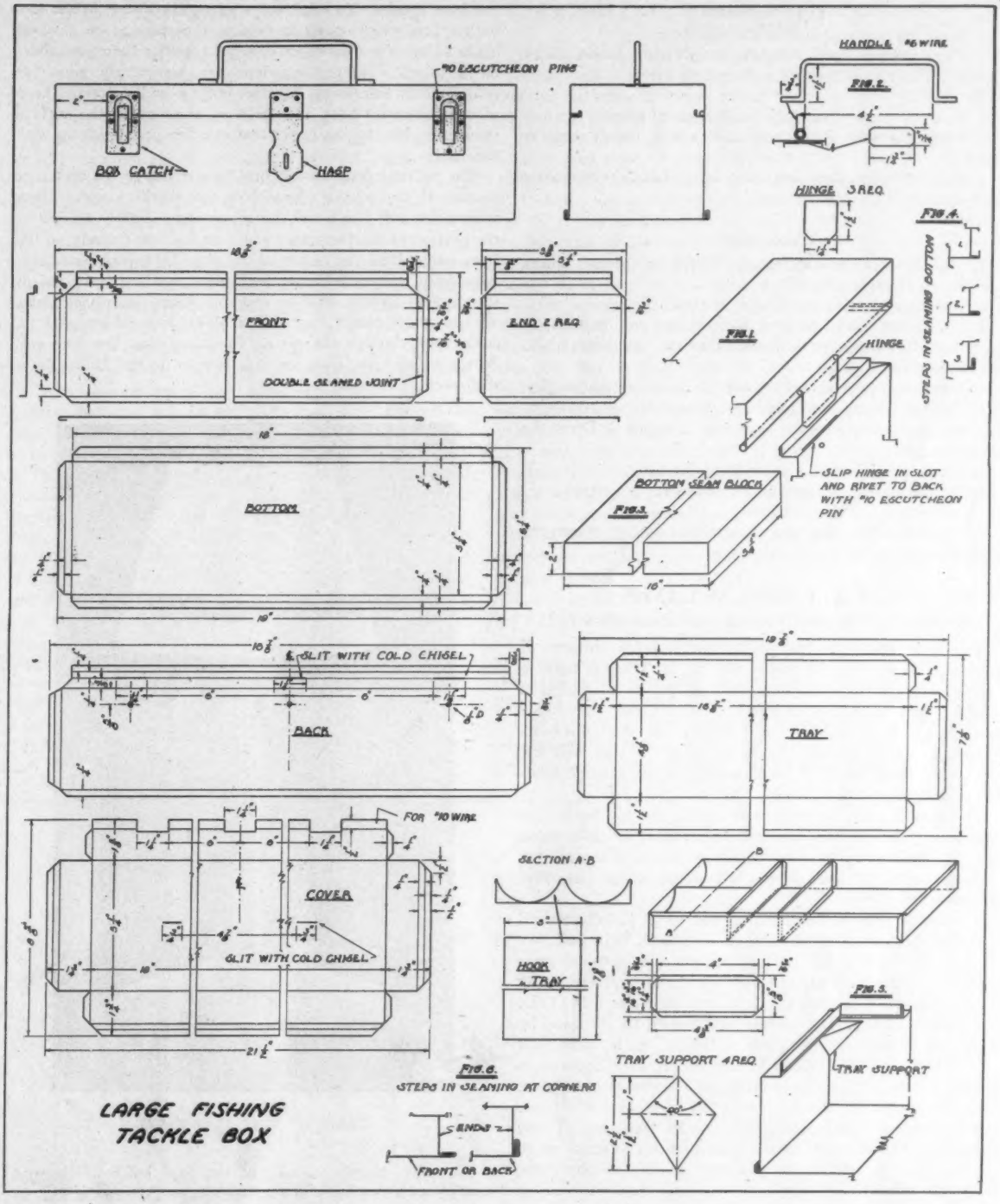
1. Study the drawing and model carefully to understand the construction of the project.
2. Read the job sheet to note whether any new operations are involved in this project.
3. When demonstrations are given, ask questions if in doubt about any part of the construction of the project.
4. Make a trial sample of a joint or construction which is new, in order that it may be more clearly understood when it is worked out on the project.
5. Go over the drawing and note the number of pieces required and the dimensions of each piece.
6. Cut out all the material for the project.
7. Cut the brass No. 10 escutcheon pins to correct length for riveting.

Material

No. 28 galvanized iron, IC tin plate, No. 10 brass escutcheon pins, No. 10 wire, and No. 6 coppered wire.

Body:

1. Fold the allowance of 3/16 in. on ends of back and front for the double-seamed corners.
2. Fold the allowance of 3/16 in. on end pieces over at right angles for the double-seamed corners.
3. Turn out, at right angles, the ¼-in. allowance for the bottom double-seamed joint.
4. Fold the top edge of body pieces to the shape shown. Make the first fold slightly less than ¼ in. for the dimension indicated on the drawing.
5. File the mitered corner joints for a tight fit.
6. Slip the pieces of body together and complete the double-seamed joint at the corners as shown in Figure 6. Be certain to dress the seam carefully.



Cover

1. Fold three edges of cover for ¼-in. closed lock and the remaining ¼-in. allowance over at right angles.
2. Fold the remaining edge for No. 10 wire. This is the back of the cover.
3. Insert a No. 10 wire into back edge of cover and complete on wiring machine.
4. Slip the cover on the folding block and bend sides down. Leave the edges of the cover slightly rounded.
5. Bend the corner laps in place and solder securely.
6. Slip the three hinge pieces around wire in the cover and form securely with pliers.
7. Set the cover on body and adjust in order to make a tight joint.
8. Locate the box catches and upper half of hasp and rivet the upper half of each on to the cover. This is done at this stage of construction because it is more convenient to remove cover and rivet before the hinges are fastened to the body.

Handle

1. Form the handle to the required dimensions.
2. Slip the handle clasps around ends of wire and draw tight with pliers.
3. Slip the clasp through slits in cover, hold handle securely in vise and bend clasps down. Sweat solder around handle clasps.

Tray Supports

1. Bend the tray supports to correct shape.
2. Place them in position as shown in Figure 5, and solder securely. The tray should fit well up into cover.

Tray:

1. Fold the single ¼-in. hem on all edges of tray.
2. Complete folding the tray and solder corner laps in place.
3. Fold the partitions and hook tray. Locate and solder each securely.

Assemble

1. Slip the cover in position and drill holes through hinges for No. 10 escutcheon pins.
2. Complete riveting the hinges in place.
3. Locate the lower part of box catches and hasp. Drill holes and rivet securely. Be certain that the box catches hold the cover down tightly.
4. Bend the edges of the bottom ¼ in. up at right angles.
5. Slip the bottom onto body and drop in the double-seaming block and complete joint as shown in Figure 4. Dress the seam carefully.
6. Solder the joints on the inside of the body.
7. File all sharp corners and clean the entire project.

Finish

1. Paint the box and tray a suitable color of green and hang away to dry.

AN ALUMINUM LAMP

Murray V. Churchill, Pittsburgh, Pennsylvania

The lamp shown in the illustration is made entirely of aluminum except for the socket and shade. There is nothing particularly complicated about making it; it is chiefly an exercise in fitting and finishing. Nevertheless, the young craftsman who makes it can feel that he has gone well beyond the stage of merely bolting things together, and has achieved a result which is both pleasing to the eye and modern in design as well as in construction.

The base is made of two pieces of 3/16 by 1¼ by 5½-in. aluminum. The pedestal which rests on these strips is made of 9/16 by 4½ by 4½-in. aluminum plate. The tapering column is made of three sizes of aluminum tubing assembled by drive fitting.

The lower tube is 2¾ in. long and is of ½-in. standard iron-pipe size, which means that it is .840 in. O.D. and .617 in. I.D. The middle tube is 2¼ in. long and of ⅜-in. iron-pipe size (.675 in. O.D. and .489 in. I.D.), and the upper tube is 1⅞ in. long, and of ¼-in. iron pipe size (.540 O.D. and .360 in. I.D.). The column is fastened to the base by means of a piece of thick-walled tubing, ⅝ in. O.D. and ¼ in. I.D., and 1 in. long. As this tubing may be hard to obtain, it can be made by drilling out the center of a ⅝-in. rod. The socket is fastened to the top by means of a ⅛-in. standard-pipe-thread nipple, which can be made easily from aluminum. The socket is of the type intended to screw on to tubular fixtures, and can be obtained at the ten-cent store, as can the shade.

Construction of the lamp can proceed from the base up. With a scriber and center punch, lay out the centers of two holes in each of the base strips, each hole to be 1¼ in. from the end, and ⅜ in. from the inside edge. This laying out may be done on what is to be the top surface as any necessary scriber marks will be, or should be, covered by the pedestal. Drill two 3/16-in. holes at these points, and countersink them on the underside. Round off the three upper outside edges with a file, and also remove all burrs which may have been formed during cutting and drilling. Buff the strips all over on a wheel made of stitched-linen or muslin disks to which tripoli compound or some similar fine abrasive compound has been applied. To bring out a mirrorlike luster, follow this with a "coloring" operation, which is performed on a wheel made of loose muslin disks clamped together between collars on a spindle. Silica compounds are particularly good for color-buffing aluminum. During buffing and coloring, keep moving the strip back and forth so as to refine the surface uniformly. Do the flat upper surfaces first and finish up with the edges.

The pedestal plate should first be checked to see that it is square. If any of the edges show saw marks, remove them with a flat mill file. Bevel the upper edges slightly as well as the portion of the two edges which do not rest entirely on the base strips. Find the center of the plate by laying a straightedge from corner to corner both ways, scribing the point of intersection lightly with a small *x*. Mark the exact point with a center punch, and drill a ⅝-in. hole (about .002 in. undersize) through the plate. To insure that the hole will be square with the surfaces, it is best to do the drilling on a drill press.

Handmade lamp of aluminum

Next lay out the centers of the four holes which must line up with the holes in the base strips. As can be seen by checking up the layout of the strips, these holes must be 3 in. from center to center in the direction of the strips, and they should be 4 in. center to center the other way so that one-half of the width of each strip is covered by the pedestal plate.

When the four centers are located, drill four holes with a No. 21 drill to a depth of about ¼ in. Tap out these holes to receive 10–24 f.h. machine screws. Aluminum screws may be used for this purpose.

The upper surface of the plate is now given its final finish with No. 180 garnet paper, using water as a lubricant. Rub first in a direction parallel to the base strips; this will give

the base a satiny sheen consisting of very fine parallel lines. Next lay a straightedge crosswise to these lines and about ⅝ in. in from the end, and then rub the surface exposed so that the scratches formed are at right angles to the first. Do the same at the opposite side and also finish the edges.

The center hole of the plate is now reamed out to receive the ⅝-in. dowel which will hold the column. It may be a good idea to taper the dowel slightly so that when started by hand, it will stick and can be driven in completely with a rawhide mallet. If a solid dowel plug has been used, a ¼-in. hole must be drilled through its axis to admit the electric cord.

The three sections of tubing are next prepared to fit, one into another. This is done by reaming them out, if necessary, to a driving fit as was done with the hole in the pedestal plate. Again, it may help to taper the end of each tube slightly. Using a rawhide mallet, assemble the three tubes by driving each one about ½ in. into the next larger one, then drive them (as one piece) onto the dowel with an 11/16-in. I.D. tube having a smooth end. The tube will transfer the hammer blow to the bottom tube of the column. While doing this, it may be necessary to back up the dowel to keep it from being punched through the plate. Round off the top of the column with a file. Tap a ⅛-in. standard pipe thread inside the top tube and buff the column assembly all over.

Next, buy or make a ⅛-in. standard-pipe-thread nipple about 1 in. long. Making it is good practice. Thread one end of a 1-in. piece of standard ⅛-in. iron-pipe-size tube, screw it into the top of the column and thread the other end. This size of thread will fit the upper part of most light sockets.

After screwing on the base strips, attach a nickel-plated pull-chain socket and a shade, and also a length of extension cord with a bayonet plug on one end. Go over the whole assembly with a cloth containing a little buffing compound. Put on the bulb, snap on the shade, and you have a work of art fit to adorn either milady's boudoir or milord's radio cabinet.

ISOMETRIC-DRAWING TEMPLATE TRIANGLE

Nahum J. Rosen, Bronx, New York

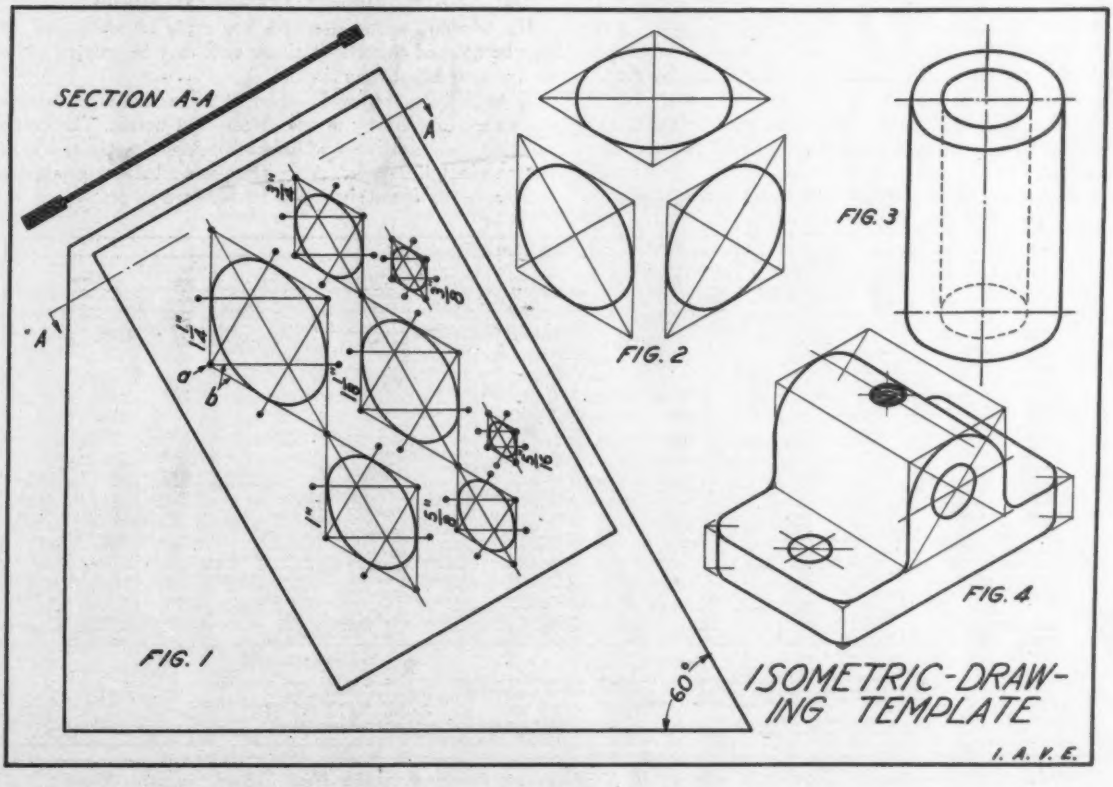
Almost all teachers of mechanical drawing have extensive use for isometric drawing, either for illustrating lectures or presenting jobs to the classes.

A way of cutting down the amount of work attached to making this type of drawing, with considerable saving of time, is with the use of the isometric template triangle.

To make the triangle, a thin piece of celluloid about 1/32-in. thick, has scribed over its surface, with a needle point, various sizes of isometric circles as shown in Figure 1. These isometric circles can then be dropped out or cut out by repeated scratching with a pair of dividers or bow dividers until the isometric circles fall out, forming a female template. The lines and dots *a* and *b* that remain of the construction lines scratched into the celluloid to form the isometric circles, are filled in with black ink. These marks are then used to indicate centers and tangent points necessary for quick, accurate placing and lining up of the template for inking or penciling. Next, the thin template is cut to shape and the long axis carefully lined up with the 60-deg. edge and cemented between two frames made of heavier celluloid as shown in Figure 1. The lines *c* give the original shape of the thin template. The purpose of the framing is to keep the template off the drawing paper or tracing cloth when using ink, and so prevent running or smearing of the ink when the triangle is moved.

It will be noticed that the long axes of the circles are lined up with the slanting edge of the triangle. The reason for doing this, is to allow the major axis of the isometric circles to be placed either horizontally or slanting 60 deg. either to the right or left side while on the T square according to its theory, and as shown in Figure 2.

In Figure 3, a hollow cylinder is shown. Using the new triangle, the center lines are first drawn in, that is, all the construction lines necessary. The drawing is completed by



penciling or inking in directly the isometric circles and connecting them with the vertical lines.

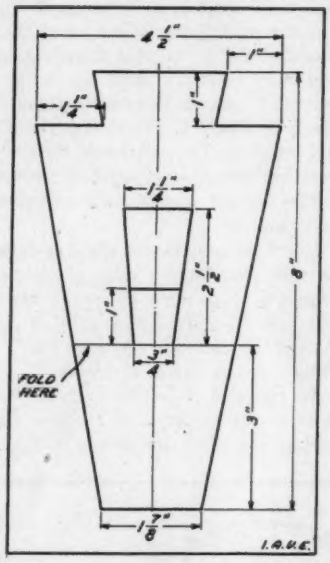
Figure 4 shows a plain bearing. This figure was drawn with many rounded portions. Again, the triangle was used to block in the light lines seen on the blueprint as the only ones necessary. The bearing drawing was then completed by drawing in directly with ink the rounded portions. A funnel pen was used with the template.

The author made one triangle with 11 isometric circles cut out, ranging in size from ¼ in. to 1¼ in.

CRACKLE-FINISHED METAL BOOK ENDS

O. H. Beaty, Junior-Senior High School, Newton, Iowa

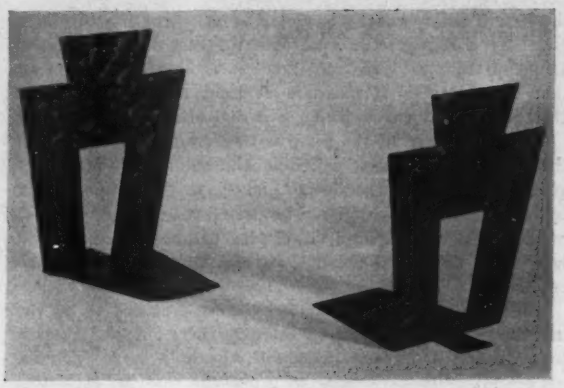
This article describes a modernistic book end and a crackle-paint finish for metal projects. The book ends have been unusually popular in our eighth-grade metal-working classes. The material is No. 20 gauge mild steel finished with crackle paint. This finish takes the place of the customary varnish, lacquer, shellac, or wax finish. We find that ball-peening the metal improves the appearance greatly.



The center part of the book end is cut with a cold chisel, and left as an extension toward the back to give stability when only one or two books are being held. This extension is left 1 in. long. All cutting and bending precedes the peening process. Only the upright and the extension need be peened.

The paint is applied by flowing it on with a brush. The crackle design appears in a short time, without the necessity of heating.

The accompanying photograph indicates a few of the projects for which the paint may be used. It has been found to be durable and may be used for finishing a wide range of types of projects.



Many colors are available, and one may sprinkle bronze or aluminum powder over the wet paint to give other effects.

A FLAT BLACK FINISH

Kenneth L. Blamey, Trade School, New Kensington, Pennsylvania

A flat black finish may be made by dissolving victrola records, that may have become cracked or broken, in alcohol. About 8 oz. of denatured alcohol will be required to dissolve ½ to ¾ of a 10-in. record. The record should be broken into very small pieces. After the record has been dissolved, the mixture should be allowed to set for about 24 hours before being used.

The solution is very easy to apply, covers well, and gives a very pleasing finish.

DUTCH WINDMILL

Al. W. Metz, Milwaukee, Wisconsin

The windmill shown herewith was made of white pine. It may be finished either by staining or it may be painted white with a delft blue trimming.

In order to get smooth action, it is necessary to balance the vanes carefully by means of the lead weight. The entire windmill then must also be balanced by moving the tail in or out on the tail support. After the proper balancing position for the tail is found, it should be fastened in place.

PROPERTIES OF SEVENTEEN COMMON WOODS

	Color Heart Wood	Color Sapwood	Weight Lbs. per Cu. Ft.	Relative Weight	Relative Strength	Relative Elasticity	Relative Hardness	Shrinkage Warpage	Durability	Works	Grain	Medullary Rays	Uses
Ash	reddish brown	whitish	39 lbs.	heavy 6th	strong 8th	elastic 10th	hard 5th	5% shrinkage warps little	not durable	hard (tough)	very porous, coarse, straight	obscure	implements, cars, bats, baskets
Birch	reddish brown	white	40 lbs.	heavy 5th	very strong 1st	very elastic 1st	med. hard 6th	6% shrinkage warps	not durable	hard	porous, close straight	numerous obscure	furniture, spools, dowels, arrows
Cypress	reddish brown	yellowish brown	29 lbs.	light 13th	med. strong 9th	elastic 9th	soft 14th	3% shrinkage warps	most durable	easily	nonporous, fine, straight	obscure	shingles, posts boats, inside trim
Fir	red to yellow	yellowish	38 lbs.	med. light 11th	strong 7th	very elastic 5th	med. hard 12th	3½-4% shrinkage warps	moderately durable	hard (slivers)	nonporous, close, straight	numerous obscure	heavy construction masts, ties, boards
Gum, red	red-brown	grayish white	37 lbs.	med. light 9th	med. strong 10th	med. elastic 14th	med. hard 10th	6% shrinkage warps very badly	not durable	easily (warps)	porous, close straight	numerous obscure	furniture, veneer saving, sleves
Hickory	reddish brown	whitish	51 lbs.	very heavy 1st	very strong 2nd	very elastic 4th	very hard 2nd	10% shrinkage warps badly	not very durable	hard (tough)	porous, close straight	numerous thin	handles, wheels, implements, bows
Mahogany	red-brown	yellow	45 lbs.	heavy 3rd	strong 5th	elastic 7th	very hard 1st	5% shrinkage warps very little	durable	well	porous, close crooked	fine obscure	furniture, interior finish, veneer
Maple, Hard	brown	light green	43 lbs.	heavy 4th	very strong 3rd	very elastic 2nd	very hard 3rd	5% shrinkage warps badly	not durable	hard (hard)	porous, close wavy	fine conspicuous	furniture, cars, handles, floors
Oak, white	brown	whitish	46 lbs.	very heavy 2nd	strong 6th	med. elastic 15th	hard 4th	5½-6% shrinkage warps	durable	hard (tough)	very porous, coarse, crooked	thick conspicuous	ships, vehicles furniture, floors
Pine, yellow	red and yellow	yellowish white	36 lbs.	heavy 8th	strong 4th	very elastic 3rd	med. hard 11th	4% shrinkage warps moderately	moderately durable	hard	nonporous, coarse straight	numerous visible	heavy construction ties, ships, bridges
Pine, western, white	brown or red	nearly white	24 lbs.	light 16th	not strong 16th	med. elastic 11th	very hard 17th	3% shrinkage warps moderately	moderately durable	easily	nonporous, straight	numerous visible	building, interior and exterior finish
Poplar	greenish or yellow blue	green white	26 lbs.	light 14th	med. strong 14th	med. elastic 12th	soft 13th	5% shrinkage warps little	durable	easily	porous, close, straight	numerous plain	furniture, car bodies veneer cores
Red cedar	dull red	yellowish white	30 lbs.	light 12th	med. strong 12th	brittle 17th	med. hard 9th	3% shrinkage warps little	very durable	easily	nonporous, close, straight	numerous obscure	pencils, posts, chests, pails
Red cedar, western	dull brown or red	nearly white	23 lbs.	light 17th	med. strong 11th	elastic 8th	soft 16th	3% shrinkage warps little	very durable	easily (splits)	nonporous, coarse, straight	numerous obscure	shingles, posts, siding, cabinetwork
Redwood	red to brown	whitish	26 lbs.	light 18th	weak 17th	brittle 16th	soft 15th	3% shrinkage warps little	very durable	easily	nonporous, straight	numerous obscure	shingles, timbers, posts, siding, ties
Sycamore	reddish brown	light brown	35 lbs.	medium 10th	med. strong 13th	med. elastic 13th	med. hard 7th	5% shrinkage warps very little	very durable	hard (across grain)	porous, close, green	large conspicuous	furniture, bowls butcher blocks
Walnut	chocolate brown	cream	38 lbs.	heavy 7th	strong 9th	elastic 6th	hard 6th	5% shrinkage warps little	very durable	well	porous, straight	numerous obscure	gunstocks, veneer, cabinetwork

Remarks

ELASTICITY of wood is its ability when forced out of shape by bending, twisting, etc., to regain its former shape.

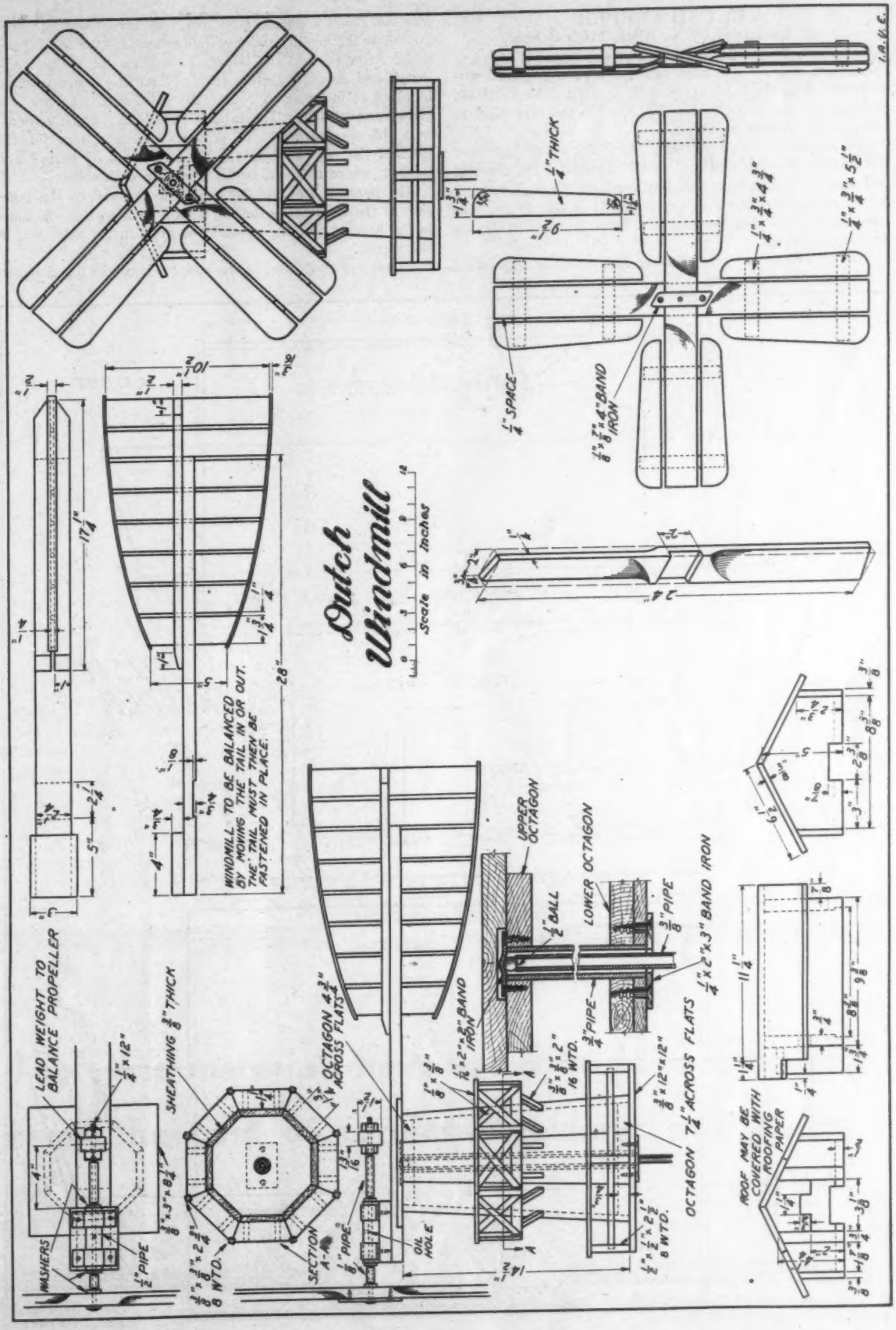
HARDNESS of wood is its ability to resist indentation and wear.

DURABILITY of wood is its ability to withstand decay when exposed to moisture.

Authorities Consulted

Handbook on the Trees of Northern States and Canada, Hough.
Bureau of Standards Circular No. 70.
Materials for the Household.
Wood and Forest, Hayes.

Properties of Seventeen Common Woods, by H. H. Robinson, Principal, Senior High School, Augusta, Kansas


Dutch Windmill
Scale in inches
I.A.V.E.
1" THICK
1" SPACE
⅜" × 3" × 4" BAND IRON
1" × 3" × 4"
1" × 3" × 5"
WINDMILL TO BE BALANCED BY MOVING THE TAIL IN OR OUT. THE TAIL MUST THEN BE FASTENED IN PLACE.
LEAD WEIGHT TO BALANCE PROPELLER
SHEATHING ⅜" THICK
OCTAGON 4" ACROSS FLATS
UPPER OCTAGON
LOWER OCTAGON
BALL
PIPE
⅜" × 2" × 3" BAND IRON
OCTAGON 7½" ACROSS FLATS
ROOF MAY BE COVERED WITH ROOFING PAPER
WASHERS
SECTION A-A
OIL HOLE

A BRUSH KEEPER

J. F. Larmore, P. A. Allen High School, Bluffton, Indiana

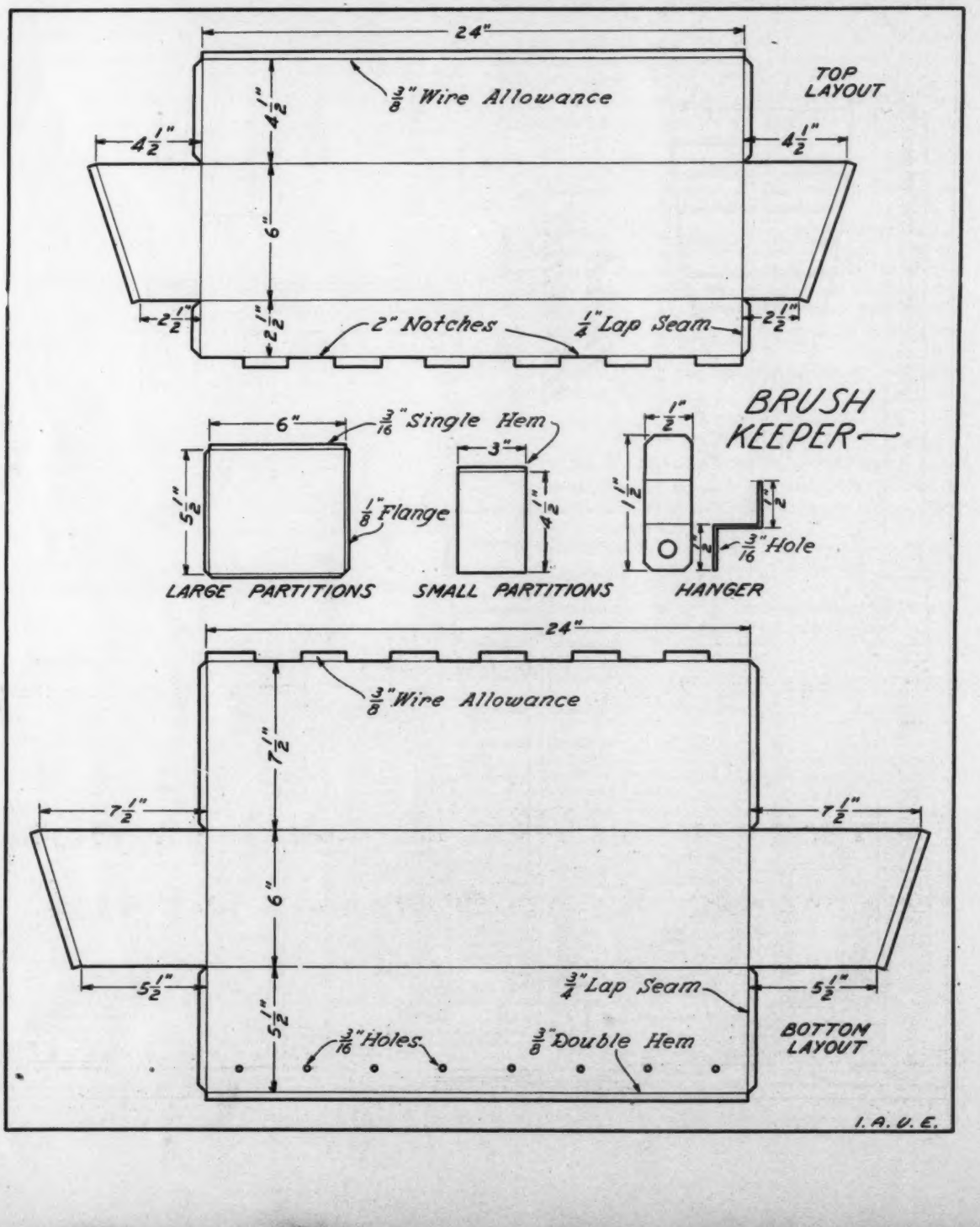
In many shops where large numbers of inexperienced students are using the finishing room, it is often quite a difficult problem to care properly for the brushes that are used in the various finishing materials.

The keeper described herewith has many advantages over the average methods that are used in caring for the brushes, and in a very short time will pay for itself through brushes and finishing materials that are saved. It is also of value in teaching the students the proper thinner to use for various finishing materials.

The materials that are used are No. 28-gauge galvanized iron and No. 9 coppered steel wire. The accompanying drawings show the layouts and give full dimensions for the various parts. After the top and bottom have been cut, formed, soldered, and hinged together, the large partitions are soldered in place at intervals of 3 in., thus dividing the keeper into eight compartments. The smaller partitions may be soldered into the compartments to provide smaller spaces for the brushes that are used in the various colors of enamel and lacquer, where only one brush is used in each color.

The hangers are cut and bent and soldered to the inner side of the back of the box in such a position that the holes in the hangers will line up with the holes in the front side of the keeper.

Labels are shellacked to the under side of the lid, designat-



ing what brushes and what thinner are to be kept in the compartment directly under each label. The brushes have a ⅛-in. hole drilled through the handle near the top for tagging, and a 3/16-in. hole drilled just above the metal that binds the bristles. The brushes are suspended on a piece of heavy wire and the compartments filled with the thinners till the bristles are entirely covered.

The various brushes should be suspended in the thinners as listed below:

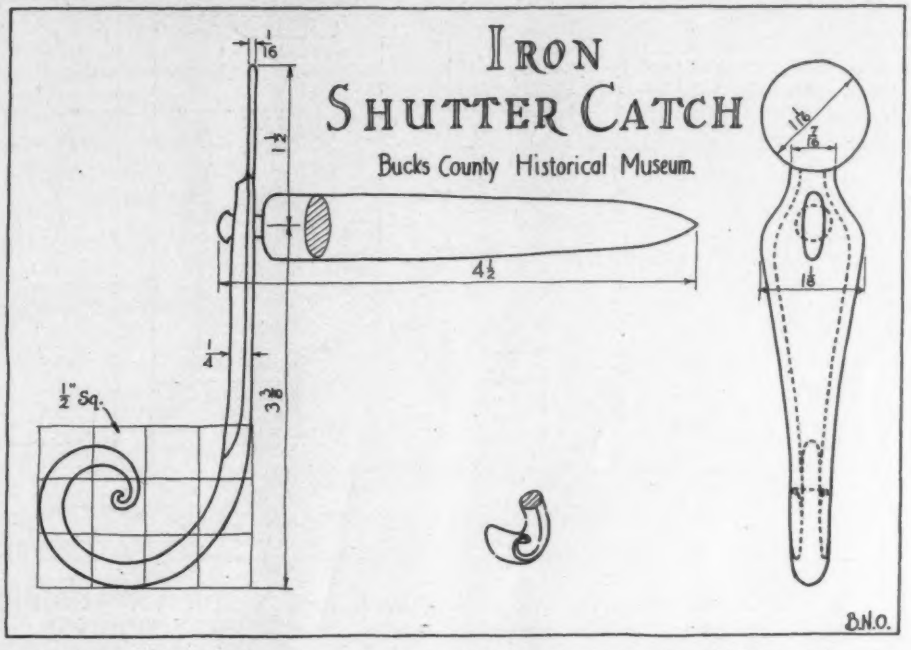
Brushes	*Thinners*
Brown oil stains	Turpentine
Red oil stains	Turpentine
Liquid fillers	Turpentine
Paste fillers	Turpentine
Shellacs	Alcohol
Varnishes	50/50 boiled oil and turpentine
Enamels	50/50 boiled oil and turpentine
Lacquers	Lacquer thinner

PAGES FROM A MUSEUM SKETCHBOOK

Burl N. Osburn, State Teachers College, Millersville, Pennsylvania

Iron Shutter Catch

This shutter catch is saved from mediocrity by an unusually fine scroll which forms the weighted end. When



hung on the long spike which was driven into the window frame, this scroll drops downward, bringing the flat plate up in front of the shutter.

RACK FOR SCISSORS

Kenneth R. LaVoy, Syracuse, New York

Each class in sewing and in art work will welcome one of these racks, and the teacher will be especially grateful,

FOR YOUR BULLETIN BOARD

POSTER 61 **SEPTEMBER, 1935**

Tools and materials have value, and the user must carry the cost of careless breakage and waste.

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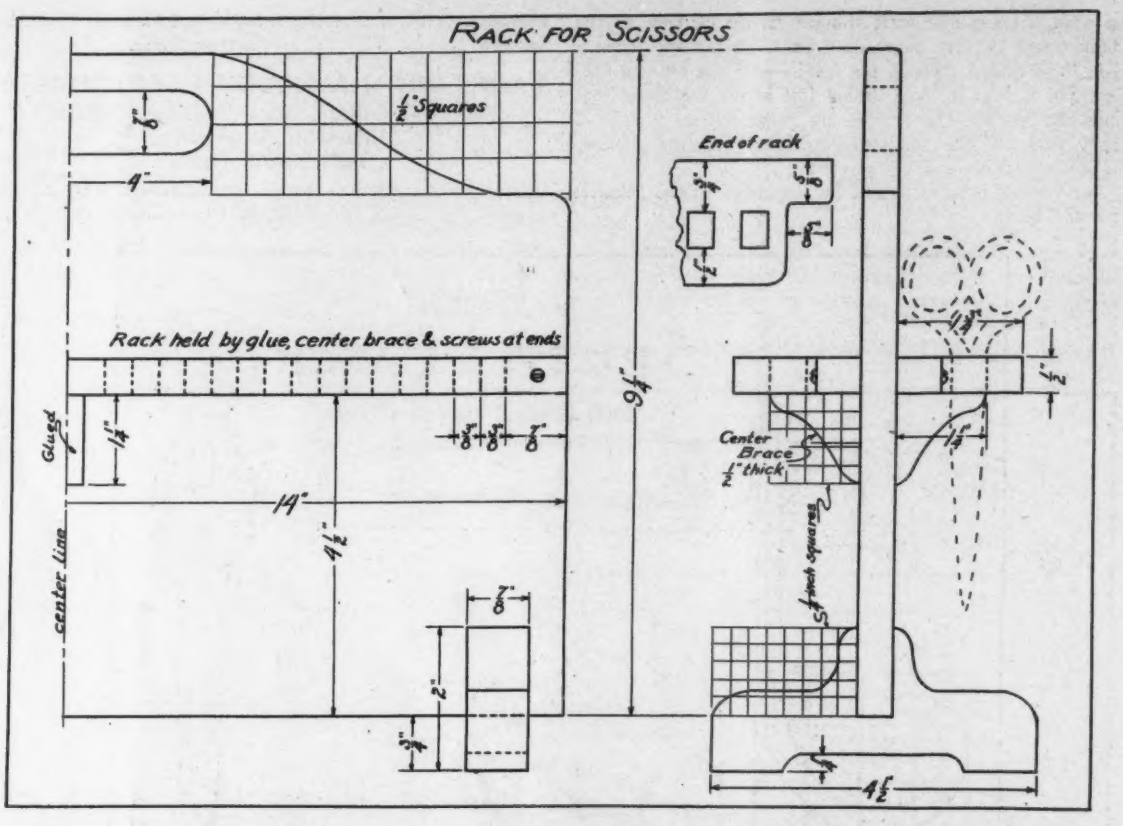
Submitted by Professor L. M. Roehl, Cornell University, Ithaca, New York



because the racks facilitate the distribution and collection of the scissors, and a closer check can be kept to prevent losing them.

The project ties up the work of the shops with the interest of the school, thereby justifying its inclusion as a problem in the shop program.

From the standpoint of tool usage, the rack is an exceedingly interesting problem, whether produced on the individual or production basis.

ARTICLES MADE FROM OLD AUTOMOBILE SPRINGS

J. I. Wilson, High School, Negaunee, Michigan

The forge-shop class of the Negaunee High School is making knives and many other useful tools from old automobile springs.

In making a knife, the blade is first forged to shape, then filed or ground on an emery wheel. The blade is then hardened, tempered, ground, and polished. The handle is made

FOR YOUR BULLETIN BOARD

POSTER 62 **SEPTEMBER, 1935**

No teacher can teach one who is unwilling to work and learn.

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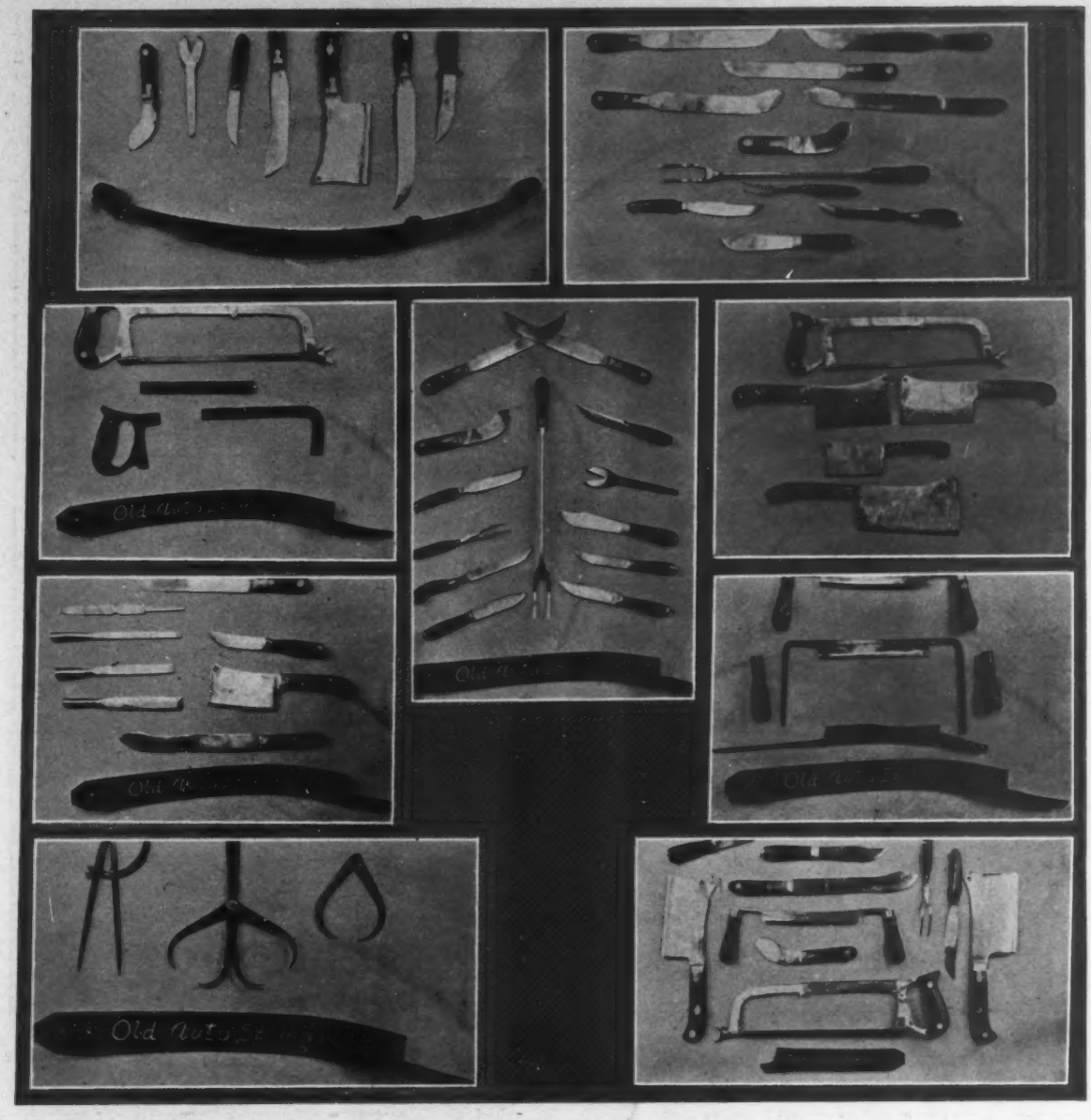
Submitted by Professor L. M. Roehl, Cornell University, Ithaca, New York



Things made from old auto springs

of layers of birch bark or of black, red, white, or mixed fiber with brass or aluminum fittings on each end. The entire handle is then shaped, oiled, and finished as desired. Deer horns also are occasionally used for knife handles.

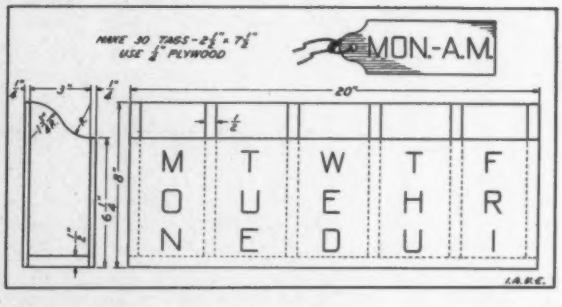
As old automobile springs may be had readily at no cost, a considerable saving in material may be made by using them. Other articles which have been made from them are as follows: A double tool with an alligator wrench at the end and a screw driver at the other, Swedish sloyd knife, hunting knife, carving knife, carving fork, meat fork, meat cleaver, drawknife, wood chisel, hack saw, garden hoe, dividers, outside calipers, inside calipers.

GLUEROOM KINK

H. D. Thomas, Cambridge, Ohio

It frequently happens in woodworking shops that clamps are prematurely removed from glue jobs, thereby ruining the joints. To obviate this, tags were devised which are fastened to glued work with wire or cord, indicating when the piece of work was glued.

The tags are made of ¼-in. plywood, 2½ by 7½ in.

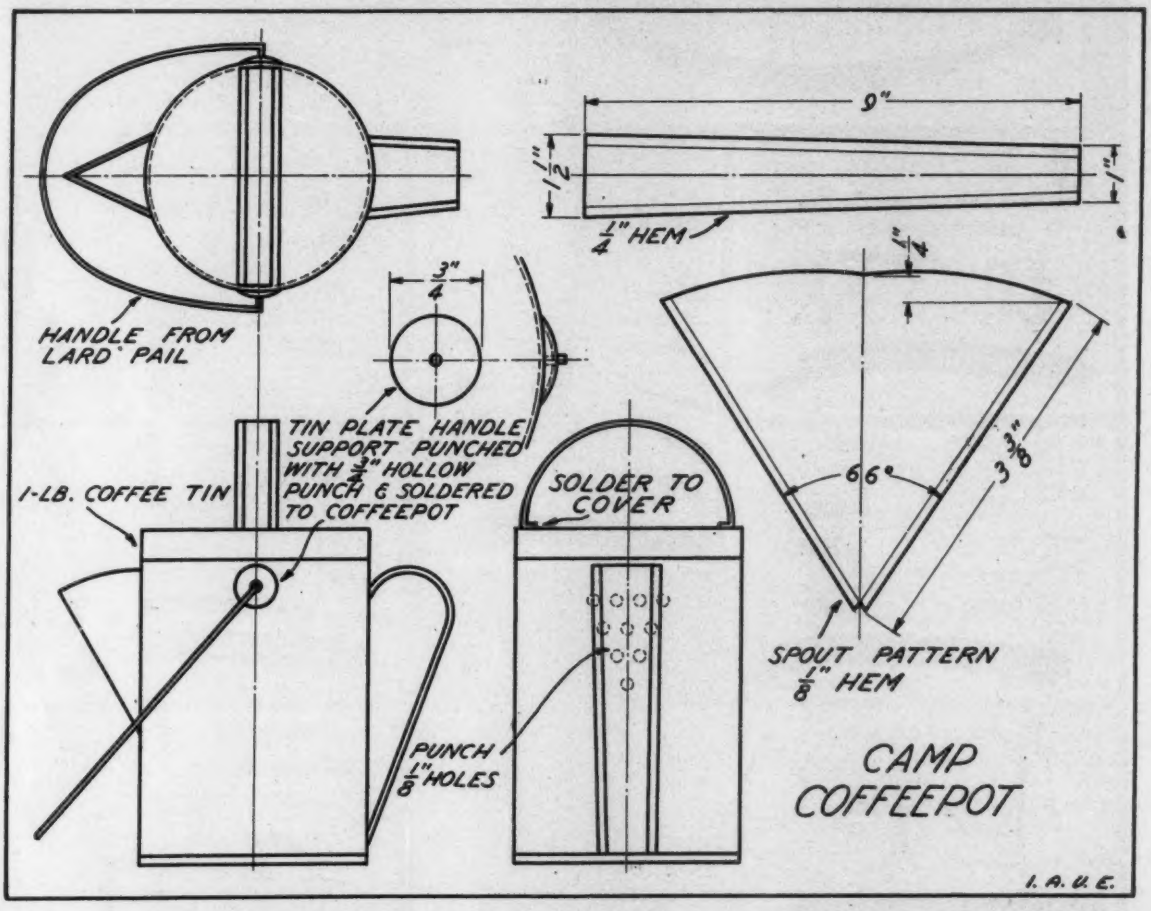


There are 30 of them — 6 for each day of the week. They are painted light gray and lettered with black — 3 for Monday, a.m., 3 for Monday, p.m., and so on. The rack for the tags shown in the illustration has been found very satisfactory, as it keeps the tags in an orderly condition. It may be mounted on the wall in a place convenient to where the gluing is done.

CAMP COFFEE POT

L. F. Barocci, High School, Cudahy, Wisconsin

The coffee pot, detailed and described in this article, is a typical home-mechanics project. Instead of the construction shown at A, in the illustration, two holes may be punched with a 10d nail near the top of the can, and a wire handle inserted. It is essential that water be in the pot constantly while it is over the fire, otherwise the solder at the seams will melt. This utensil is very practical to take along on boy-scout hikes, or on outings where stops are made for lunch.



FURNITURE SCRATCHES

Lloyd F. Stair, High School, Madison, New Jersey

The purpose of this article is to furnish information concerning the materials, tools, and processes necessary in patching up the varnish or lacquer finish on furniture, which has become scratched and marred.

The first step in patching a scratch is to stain the exposed wood to match the surrounding area. There are many ways to stain wood, and each has advantages or disadvantages under different conditions. There are four classes of stain: chemical, water, oil, and spirit. If one is familiar with the action of a given stain on a given wood, and that stain is on hand, then all that is necessary is to stain the scratch to the desired color.

A simple retouching kit should contain the following, all of which may be purchased at a hardware or paint store:

1. 190-proof denatured alcohol for thinning shellac, French polishing, dissolving color for staining, alcohol torch, etc.
2. Bismark brown and malachite green, dry colors, which are soluble in alcohol. These can be purchased by the ounce. They are aniline dye powders. With these two colors and alcohol, it is possible to mix up any shade of furniture stain, from light oak to dark mahogany. This spirit stain is more convenient and suitable for the purpose than other types of stain.
3. White shellac varnish is fine for retouching work because it dries quickly and can be colored by the spirit stain or aniline powders already mentioned.
4. Clear stick shellac looks much like sealing wax and can be melted with a heated knife.
5. No. 6/0 garnet sandpaper.
6. No. FF pumice stone. This comes in a white powder form.
7. Crude oil to be used for rubbing.
8. A kitchen vegetable knife or a cheap screw driver for heating the stick shellac.
9. An alcohol lamp (or gas stove) to heat the knife. Do not use a kerosene or wood flame.
10. Small touch-up brushes, ⅛ in. and ¼ in.
11. A bottle of liquid wax.
12. Rubbing felt about ½ by 2 by 4 in.
13. Cheesecloth or clean rag.
14. Clean ink bottles or cheese-spread jars for stain and shellac.

In order to stain a scratch, mix a suitable shade of stain in a clean ink bottle or cheese-spread jar. Various shades of red-brown mahogany may be matched with a spirit stain of bismark brown and alcohol. If malachite green is added to the other two materials, almost any shade of brown may be matched. In mixing such a spirit stain, one must be sparing with the color. It is better to stain a scratch too light than too dark. Try the stain on a spare piece of clean hardwood. Experiment until you have a good color match, then label the

bottle light oak, walnut, light mahogany, or dark mahogany. If corked up tight, the same stain may be used many times later on.

Pick up some stain on a ⅛-in. brush and apply the stain to the scratch. Now rub the varnish surface briskly with a clean piece of cloth. In cases of very small scratches, this procedure will often soften the varnish about the scratch so that the brisk rubbing will completely fill in the mark. This process may be repeated several times until the mark disappears.

However, if the scratch does not fill in by rubbing, then use stick shellac. Heat the knife over the gas or alcohol flame and at the same time warm the stick shellac near the flame. Melt a drop of shellac on the point of the knife and fill the scratch on a level with the varnish. Smooth the shellac before it hardens with the end of a finger. Shave off excess shellac with a razor blade or keen-edged wood chisel.

Should the marred place in the finish be larger than a scratch, stain as directed for a scratch. Then brush on at intervals of 60 minutes, several coats of shellac thinned with equal parts of alcohol. The shellac may be colored with some of the mixed stain. Before each coat is dry, rub the edge of the marred place with the end of a finger, so that a line between the old and new finish will not show. Repeat this process until the finish is level again.

After the stick shellac or liquid shellac has been applied, rub the new finish very lightly with the No. 6/0 sandpaper until it is level with the surrounding area.

Next, sprinkle rubbing oil and powdered pumice on the felt pad and again rub the repaired spot lightly. Follow this by rubbing lightly with the fingers dipped into the oil and pumice. Then clean the area with a cloth.

Dampen a clean cloth with a few drops of alcohol and rub the area briskly and hard to remove traces of the rubbing oil and to polish the varnish. Do not allow the alcohol rag to stay on the varnish in any given spot, and rub at the most for only a second, otherwise the alcohol will cut into the varnish.

To clean and polish the whole piece of furniture, dampen a clean cloth with liquid wax and rub the finish until the wax becomes dry and hard.

To make one's own liquid wax, take 1 lb. of white beeswax, ¼ lb. of carnauba wax, and 1 qt. of turpentine. Place these materials in a clean can, which in turn should be set in a pan or pot of hot water. Allow the wax to melt and dissolve in the turpentine. If the water must be reheated, remove the wax can for the time being. Turpentine must not be placed near fire — it is too dangerous. If this recipe is used, a harder wax than that obtained with the ready-mixed kind, will be obtained.

References

Handwork in Wood, by Noyes (The Manual Arts Press, Peoria, Ill.), Chapter X on Woodfinishing.

First Aid for the Ailing House, by Whitman (McGraw-Hill Book Co., New York), Chapter XV on Furniture.

Principles of Woodworking, by Hjorth (The Bruce Publishing Co., Milwaukee, Wis.), Chapter XVI.

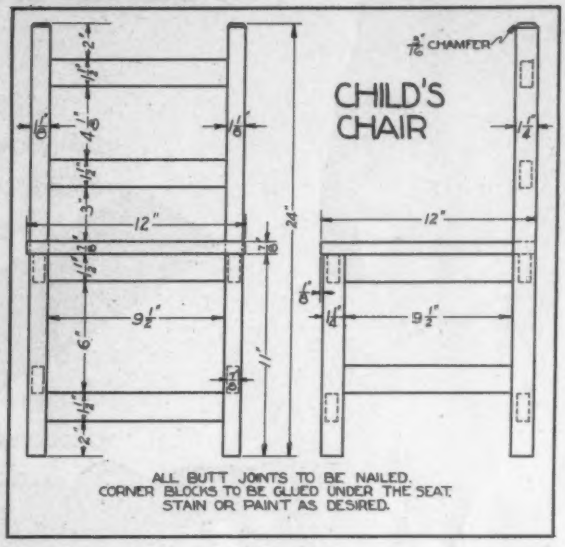
Principles of Mill and Paint-Shop Practice, by Waring (The Bruce Publishing Co., Milwaukee, Wis.).

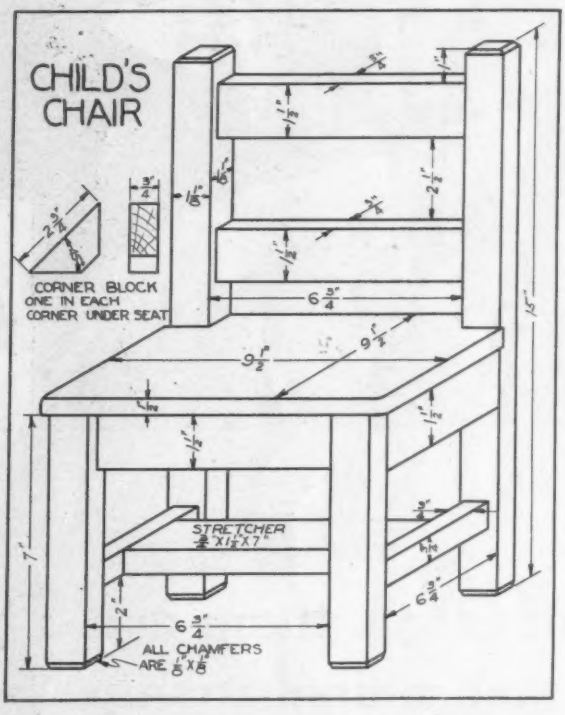
Woodwork for Secondary Schools, by Griffith (The Manual Arts Press, Peoria, Ill.), Chapter VII on Wood Finishing.

CHILD'S CHAIR

Glenn H. Osborne, High School, Ottumwa, Iowa

This is an excellent problem for an eighth-grade or first-year high-school student and will prove of great value around the home where there are a number of small children. The two sizes drawn are for children from two to four years of age. For older children the chair should be made taller and wider.





Practically all of the lumber in this chair should come from the scrap box. All joints are to be butt joints, and are to be fastened through the legs with 6d or 8d finish nails. Note the corner blocks to be glued and nailed under the seat. After the chair is finished, it should be painted a bright color, using some kind of brushing lacquer.

Chairs of this type will last for years as they are quite sturdy. A complete set might consist of four chairs and a table.

A TABLE LAMP MADE OF CANS

Ambrose B. Charette, Milwaukee, Wisconsin

The attractive modernistic tin-can table lamp described herewith has proved very interesting to my students. The tools needed are a ½-in. hollow punch, a ¼-in. solid punch, a pair of dividers, a pair of tin snips, a ruler, a soldering copper, and a gas soldering furnace. The upright is made

(Continued on page 10A)

WILL THEY BE EQUAL TO

How they think will count as much as what they know

Without ideals there can be no real craftsmanship

When the boys of today are tomorrow's men, will the forward march of science, architecture and engineering continue? Of even greater import to the future than the mere teaching of prescribed subjects is the tremendous influence of instructors on the *thinking* . . . on the ideals and perspective of the next era's men.

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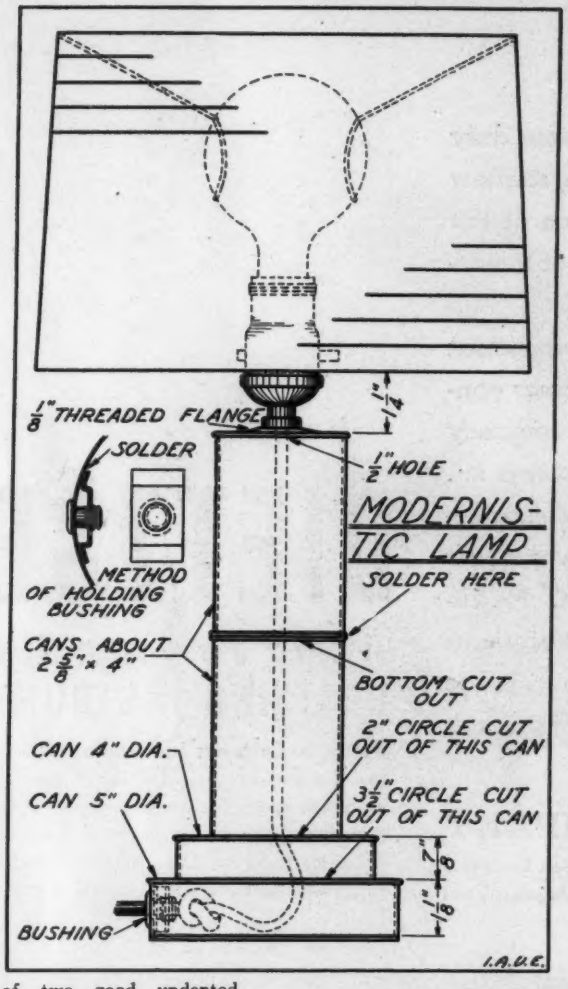


of two good undented cans about 2⅝ in. in diameter and 4 in. high. Smooth up the cut-outs at the top and punch a ½-in. hole in the bottom of one and cut the entire bottom out of the other can. Apply a heavy coat of solder to the inside of the rims where the cans are to be fastened together as shown in the illustration. The can may be held for the soldering operation by passing a threaded pipe or a long bolt through the two cans, placing washers at both ends and then tightening up the nut to hold the cans firmly in position. Be sure to have all vertical seams in the cans aligned in the assembly. The Joint can then be heated uniformly by revolving over the flame of the gas soldering furnace until the solder melts. This holds the two cans tightly together.

The top part of the base consists of a 4-in.-diameter can. Cut down the sides until the can is ⅞ in. high. Cut a 2-in. hole out of the center of the bottom, then attach this section to the open end of the other two cans in the same manner as was described before. The joint can also be made by holding the cans in place and running a heated soldering copper slowly around the seam. The bottom section of the base is made of a 5-in.-diameter can cut down to a height of 1⅛-in. Cut a 3½-in. hole through the center of the bottom and a ¼-in. hole through the side. Solder the base in place. A sheet of tin is then soldered over the open end of the base. This sheet also may be salvaged from a discarded oil can or other large can. After this sheet is soldered on, trim it even with the base.

Next, solder a ⅛-in. pipe flange over the hole in the top of the upright, and place a rubber bushing into the ¼-in. hole in the side of the base through which the cord is to enter the lamp. A small clip should be soldered to the inside of the base as shown to hold the bushing.

Clean the metal with steel wool. Apply a coat of white enamel undercoater. After this is dry, apply two coats of white enamel. Stripe the horizontal seams with black enamel. Mask tape may be found a valuable aid in this operation.

The lamp is now ready for wiring. A nickel-plated push-button socket may be used for the top.

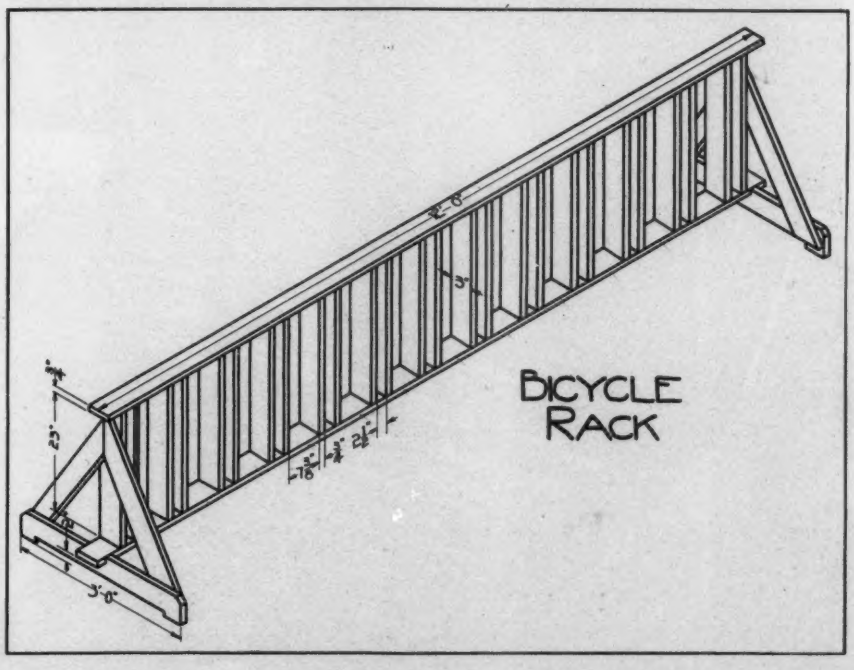
The shade should be in harmony with the modernistic design of the base. If the fittings in the shade must be changed to hold it at the proper height, the original wires may be removed and longer ones inserted.

Associations, Conventions

KENTUCKY INDUSTRIAL-ARTS TEACHERS REORGANIZE FOR 1935 SCHOOL YEAR

The industrial-arts teachers of Kentucky held their first regular meeting April 18, following the reorganization of the association. About 65 teachers representing the field were in attendance. The meeting was held in the Kentucky Hotel and the subjects for discussion were interesting and helpful. Those on

(Continued on page 12A)



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6. Height of cabinet from floor to lower edge of working surface, 39 inches. Total height from floor to top of lead and slug rack, 57 inches. Floor space, 42x26 inches.
7. Sanitary base permits keeping floor clean under cabinet.
8. Working top overhangs 3 inches on each side, providing comfortable knee clearance for pupils working at the case.
9. Substantial construction of hardwood with flat varnish finish.
10. Where desirable, cabinet may be ordered without overhead lead and slug rack, and with lead and slug case.
11. Double working-bank top with or without lead and slug rack may be attached to No. 9178 American School Type Cabinet.

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(Continued from page 10A)

the program were Roy A. Lawrence, of Louisville, and H. J. Shultz, of Berea, who talked on "The State Industrial-Arts Curriculum"; C. R. Uphoff, Hapkinsville, C. C. Shipley, Georgetown, and N. J. Ranum, Somerset, who discussed "The Single Period vs. The Double Period in Teaching"; D. S. Moseley, Anchorage, and Marshall Hurst, Ludlow, who took up the subject, "Industrial Arts in Modern Education."

At the business session, the association elected the following officers for the year 1935: President, H. D. Shultz, Berea; vice-president, D. D. Moseley, Anchorage; secretary, E. B. Stansbury, Bowling Green.

REPORT OF THE MICHIGAN RESEARCH COMMITTEE

The Research Committee on safety education of the Michigan Industrial Education Society is committed to the philosophy that accidents are but the manifestation of human or mechanical inefficiency. The objective of the committee has been to effect a satisfactory carryover from training in the school shop to efficient workmanship in industry. It is the purpose to develop within the pupil a set of safe habits that will keep him from harm and danger by making him safety conscious at all times.

With this idea in mind, the committee has distributed a pamphlet entitled, *I Am an Idea*. This was followed with another one entitled, *Check and Double Check*. The last publication, *Shop Safety Rules for Teachers and Students*, was prepared by the committee and published in 1934 by the State Board of Control for Vocational Education, and was distributed to all shop teachers in the state.

The State Bulletin on General Safety Education, now in progress, will include a chapter on school-shop safety. It was prepared by Mr. Harry Burnham, a member of the committee.

The committee has studied the relationship between accidents and poor lighting. A recent inspection of school shops in Detroit revealed that the concentrated safety program is giving results in dollars and cents in excess of the cost of the program. For instance, the student supervision of accident prevention through student safety engineers, and the general improvement in "housekeeping" conditions, have made it possible to accommodate larger classes which the depression had forced upon the schools.

The research committee is composed of six members, of which Mr. Carl E. Karlstrom, Detroit, is chairman.

MEETING OF THE PEORIA INDUSTRIAL-EDUCATION CLUB

The last meeting of the Peoria Industrial-Arts Club, on Monday evening, May 6, was a dinner meeting at the Thompson Inn.

Following the dinner, the assembled group gathered at the Senior High School auditorium where they listened to the addresses and discussions. Mr. Frank Hardin, head of the industrial-education department of the Manual Training High School, Peoria, read a report of the spring meeting of the Illinois Vocational Association held at Urbana.

Mr. A. F. Siepert, of Bradley Institute, Peoria, spoke on the topic, "A Problem in Adult Education," in which he described the adult-education program which is being carried on in Lansing, Mich. The city has a night-school attendance of over 1,000 persons, and all of the instructors donate their time.

Mr. Charles A. Bennett gave a report of the Western Arts Association meeting held recently in Chicago.

The attendance at this meeting was one of the largest of the season, with 36 members and guests present. Visitors were present from Galesburg, Canton, Elmwood, and other cities in the vicinity.

Mr. Brockert M. Bates, of Elmwood, was elected as the new member of the program committee, who will work with Oroville Connett and C. M. Hewitt.—*Floyd L. Barloga.*

NEBRASKA INDUSTRIAL-ARTS TEACHERS MEET IN LINCOLN

The industrial-arts teachers of Nebraska, at their meeting at the University of Nebraska, Lincoln, on Saturday, May 4, organized the Nebraska Industrial-Arts Teachers' Association.

At the morning session, Dr. C. A. Fulmer and Mr. Sidney Owen, of the State Board for Vocational Education, addressed the gathering. Mr. C. A. Bowers, secretary of the Nebraska Teachers' Association, spoke at the luncheon at the University Club.

The organization of the association was effected at the afternoon session, when an executive board of six members, representa-

(Continued on page 17A)

A DELTA INSTALLATION IN A LEADING CALIFORNIA JUNIOR HIGH SCHOOL—ANOTHER EXAMPLE OF THE RAPID SPREAD OF THE USE OF **DELTA** TOOLS FOR VOCATIONAL EDUCATION.

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Personal News

DR. NEWKIRK SUCCEEDS MR. WORST

Dr. Louis V. Newkirk, who has been at the Chicago Normal College since 1931, has been appointed to fill the vacancy occurring upon the retirement of Mr. E. A. Worst, former Director of Hand-Work Activities, Chicago Public Schools.

Mr. Newkirk, besides fulfilling the duties of his new position, will continue to offer courses in industrial education through the College of Education, North Western University, during the coming school year and next summer.

LOUIS V. NEWKIRK
Director Hand-Work Activities
Chicago Public Schools

He is a member of several national honorary fraternities in education, a member of the National Education Association, American Vocational Association, the Manual Arts Round Table, and The American Vocational Association Committee on Testing in Industrial Arts.

Mr. Newkirk also is known as the author of a number of professional books and a contributor to the periodic literature of his profession.

HAPGOOD APPOINTED SUPERINTENDENT

Mr. E. A. T. Hapgood, for sixteen years assistant superintendent of schools in charge of vocational education and industrial arts at Albany, N. Y., has been elected superintendent of schools at Mount Morris, N. Y.

Mr. Hapgood is a graduate of the Polytechnic Institute at Worcester, Mass., and New York State College of Albany, N. Y., and holds a B.S. degree in education given by Columbia University, and an M.A. degree awarded by the same institution. After serving as an instructor in high schools in Massachusetts,

E. A. T. HAPGOOD
Superintendent of Schools
Mount Morris, N. Y.

he became director of arts in 1916 at East Orange, N. Y. In 1918 he was made director of vocational education at Albany, N. Y., and held that position until his recent appointment as superintendent of schools at Mount Morris, N. Y. He is an experienced draftsman, cabinetmaker, and patternmaker, and has held executive positions in a number of industrial establishments in Massachusetts and in New York City.

Mr. Hapgood also has assisted in making educational surveys in New Jersey, Pennsylvania, and Delaware.

DR. BAWDEN ACCEPTS APPOINTMENT AT KANSAS STATE TEACHERS COLLEGE

Dr. Wm. T. Bawden has just been appointed Head of the Industrial and Vocational Education Department of the Kansas State Teachers College, Pittsburg, Kans. He will also be the Director of Graduate Courses in that department. He will take over his new duties on September 1.

Dr. Bawden will retain his editorial connection with the Industrial Education Magazine, Peoria, Ill.

A part of the group of 350 industrial-arts and vocational-education teachers who attended the Fifth Annual Spring Conference, Columbia, Miss., April 26 and 27, 1935

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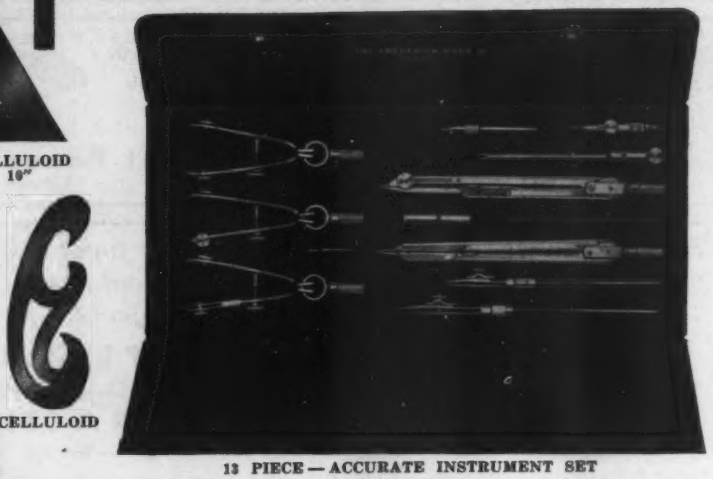
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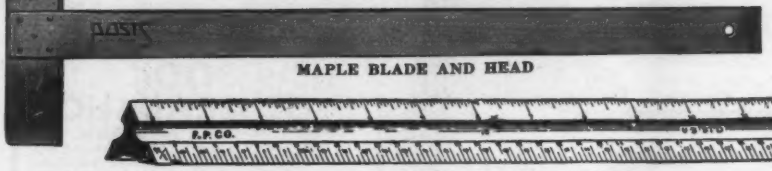
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(Continued from page 12A)

tive of each of the districts, was chosen. The Association will affiliate with the American Vocational Association, the Nebraska Vocational Association, and the Nebraska Teachers' Association. Two meetings each year will be held — one in the spring and one in the fall.

The Association elected the following officers for the coming year: President, A. C. Easton, Lincoln; vice-president, A. V. Larson, Peru; secretary-treasurer, L. G. Lindahl, Chadron; also P. A. Tucker, Norfolk; G. Y. Conley, Holdredge; R. A. Schreiner, Kearney. — *L. G. Lindahl.*

CONNECTICUT INDUSTRIAL ARTS ASSOCIATION

The first conference of the State Board of Education, Superintendents, Secondary School Principals, Industrial Arts Instructors, and Supervisors, was held at Teachers College of Connecticut in New Britain on May 24 and 25, with 250 persons attending.

President Arthur Feuerstein presided at the general meeting. Dr. Ernest W. Butterfield, State Commissioner of Education, welcomed the Association and enumerated a number of things that it could accomplish. As a result of the Association's petition for teacher training, the state board has placed that item on the top of their list of next year's appropriations.

At the business meeting, an amendment to the constitution was made, providing for three vice-presidents instead of two. The following officers were elected: President, Walter F. McAndrews, Hartford; First Vice-President, Frank S. Whitman, Bridgeport, Conn.; Second Vice-President, Lewis Hall, New Haven, Conn.; Third Vice-President, John C. Conroy, Meriden, Conn.; Treasurer, George S. Duncan, New Haven, Conn.; Secretary, Harry A. Barnicle, Hartford, Conn.

Among the speakers at the convention were Dr. Maris M. Proffitt, Federal Office of Education, Washington, D.C.; Dr. Fred Strickler, Columbia University; Dr. William E. Warner, Ohio State University; Worcester Warren, President of the Superintendents Association; Karl Reiche, Past President of the Superintendents Association; Dr. N. S. Light, Director of Field Service, State Board of Education; and Dr. Herbert D. Welte, Principal of Teachers College of Connecticut.

SchoolShopEquipmentNews

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The Cincinnati Tool Company, Norwood, Cincinnati, Ohio, is making a new universal bench anvil which will prove to be one of the most useful tools in the shop. It combines the solid base of an anvil on a bench at a convenient height, with many of the

advantages of a vise. It is built to withstand considerable abuse and hard wear, and is always ready for service. Threaded holes permit anchoring to the bench. It is intelligently designed to take care of a wide variety of jobs, and may be used as a surface plate where extreme accuracy is not required.

THE NEW "OLIVER" No. 217 BAND SAW

The Oliver Machinery Company, Grand Rapids, Mich., has just announced a new band saw. It is known as the new 30-in. "Oliver" No. 217. This machine is completely guarded, has an automatic brake on the upper wheel, a foot brake which shuts off the cur-

(Continued on page 19A)

The School Shop Shopping Guide

ARMSTRONG TOOL HOLDERS

Spring Cutting-Off Tools make cutting-off, otherwise the most difficult and expensive lathe operation, easy.

Teach this *modern* method of cutting-off.

Form prevents Goose-neck work from climbing upon tool—the cause of most tool breakage.

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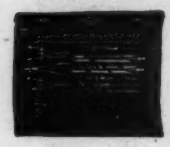

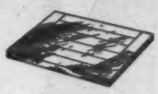

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We specialize in equipments and supplies. When ordering hammers and anvils specify "Rose".

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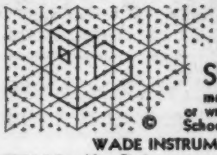

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for teachers of auto mechanics and their students

Teachers: How many students have you?

write

PEP MFG. CO.
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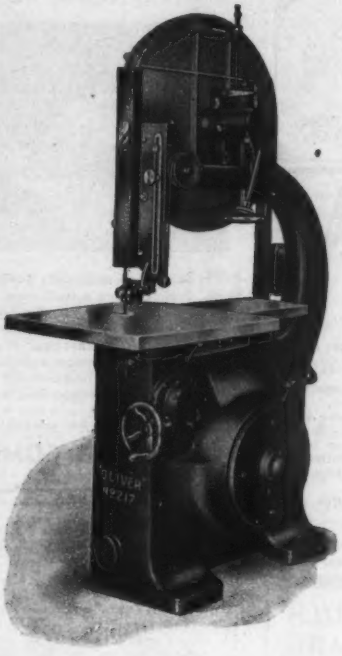
33 W. 42nd St.
New York

(Continued from page 17A)

rent and stops the machine quickly, and a dependable tension indicator.

The 26 by 28-in. cast-iron table can be tilted 45 deg. to the right and 10 deg. to the left. The machine has a capacity of 29¼ in. between saw and rear saw guard, and 15 in. under the guide.



The wheels are of the 1-piece disk type, accurately machined and perfectly balanced. The upper one is made of aluminum, the lower of semisteel. They are 30 in. in diameter and have 1½ in. wide faces which are covered with rubber. The lower wheel has a positive nonchanging alignment with the frame, while the upper is provided with a very simple 3-in. vertical screw adjustment, fitted with springs to provide the saw tension. The upper wheel also has a micrometer tilting device for controlling the tracking of the saw. All adjustments are controlled by handwheels within easy reach of the operator.

The machine can be furnished with any type of motor drive—belted, geared, coupled, silent-chain, or the fully enclosed built-in motor-on-shaft drive.

At a small extra cost, these band saws may be fitted with a hand ripping fence and special spring roll device for hand resawing.

NEW SEBASTIAN LATHE CATALOG

The Sebastian Lathe Company, Cincinnati, Ohio, has just issued its new No. 35, 48-page catalog describing and illustrating its complete line of lathes.

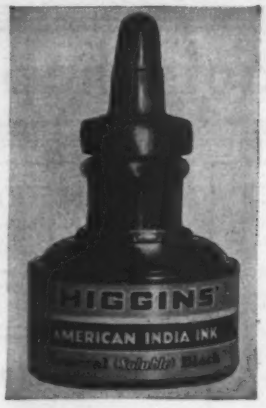
This catalog features three grades of lathes, all of which are known for their accuracy and ruggedness. The first of these is the Gold Seal 8-speed geared-head Timken-equipped lathe which represents the aristocracy of the Sebastian line.

Then comes the Viking line, with its motor in the leg, 8-speed geared-head lathe, also to be had in the form of the Viking 8-speed geared-head quick-change lathe.

The third line is known as the Sebastian cone-head lathe, and may be obtained with the underneath motor drive, bracket motor drive, and with countershaft drive.

This last line is especially to be recommended to schools where budgets do not permit of the purchase of the more expensive lathes. All of these lathes embody every known type of safety feature.

The Sebastian cone-head lathe, however, features a new safety device which makes it impossible to lift the cone belt guard for speed changing without first stopping the motor.



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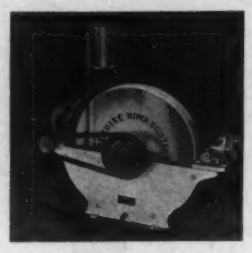

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9 SPEEDS

The new No. 46 Portable Lathe has nine speeds. A correct speed for each diameter. Face plate work up to 30" in diameter is done by rotating head to the front of the machine—handy, room-saving. Made-to-order for schoolwork. Priced remarkably low for such a fine machine.

Write for bulletin and prices.

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News Notes

Ohio State University Summer Session

The summer session of the Department of Education at the Ohio State University included enrollments from seventeen states.

At this year's Series of Dinner Round Tables the following topics were presented: Enriching the Small School's Offerings; State Department Conference on Industrial-Arts Teacher Education; Historical Evening: Bonser Biography; The Charles A. Kunou Library Gift; Meeting Problems of American Youth: Commissioner Studebaker on "The Dilemma"; The American Council's Research Project; Clubs for Secondary School Boys; Education of 600,000 CCC Boys; Industrial-Arts Teacher Education; "Scope" as a Determiner of the "Major"; Recognizing Certain Responsibilities; Projecting Teachers' Education Programs; Conclusions: 1936 Yearbook Proposal; Master's and Doctor's Degrees; Professional Needs in Graduate Study; Characteristics of Ultimate Program; Administration Considerations: Present and Future; Developing a Strong State Program; The Ohio Program to Date; As the State Department Sees It; Developments in Other States; School-Shop Planning; Technical Details; Developing Small Laboratories; Developing Large Laboratories; Current Projects in State Program; Shooting at Ideals; The Range of Content; The Drawing and Design Course of Study; Graphic Arts and the Oakland Study; The Range of Content (continued); Ceramic Industries, Metal Industries; Wood Industries, and the American Institute Proposal.

Speakers at these round tables were: Ralph L. Newing; Dr. B. O. Skinner; Raymond W. Phipps; Dr. Harry G. Good; George S. Strange; Victor L. Bowers; U. S. Office Projects; Dr. Nat T. Frame; Albert A. Grinnell; E. G. Livingston; Gordon O. Wilber; Lawrence F. Ashley; Otto A. Hankammer; Dr. W. W. Charters; Dean Wm. McPherson; George C. Decker; L. W. Reese; John R. Ludington; Willis A. Whitehead; Smith and Huss; Horrocks and Phipps; The State Committee; Glenn L. Roberts; Burl N. Osburn; E. A. Hauenstein; L. S. Crowl; Robert E. Smith; Herbert H. Sanders; Wm. D. Stoner, and Orville E. Sink.

Soap-Sculpture Prizes

The prize-winning carvings in the Eleventh Annual Competition for Small Sculptures in White Soap, were selected from over 4,000 entries at ceremonies marking the opening of this year's soap sculpture exhibition, at Mezzanine Gallery No. 3, RCA Building, Rockefeller Center, New York City.

Beonne Boronda, New York City, was awarded the first prize in the professional group for a striking sculpture of a dog, "Saluki." In the same class "Toad," by Paul Perlmutter, New York City, won second prize; "Resistance," by Paul Diana, New York City, won the third prize.

Hotel Training School

For the fifth successive year the hotel training school is being held in Miami, Florida. This school, for the training of hotel employees, is under the supervision of the department of trade and industrial education of the Dade County School Board, federal and state money being obtained for this purpose under the provisions of the Smith-Hughes Act of 1917. Classes are conducted in the following: maids, housemen, waitresses, bellboys, front office and switchboard operators. Most of the courses are in session for three hours each, for from 15 to 20 days. Training is given not only in the schoolroom but in the hotel also. A placement bureau is operated in connection with the school, and more than 2,000 students have been placed during the past four years.

Announce New Educational Film

The Division of Visual Education of the Massachusetts Institute of Technology has announced a new educational film entitled "The Graphic Representation of Machine Operations," which is intended to assist students of mechanical drawing in visualizing machine operations. It was arranged and prepared with the cooperation of the members of the drawing staff of the institution. The film depicts the various processes involved in machine-shop work and offers a detailed view of a machine drawing made by a student in the drawing class.

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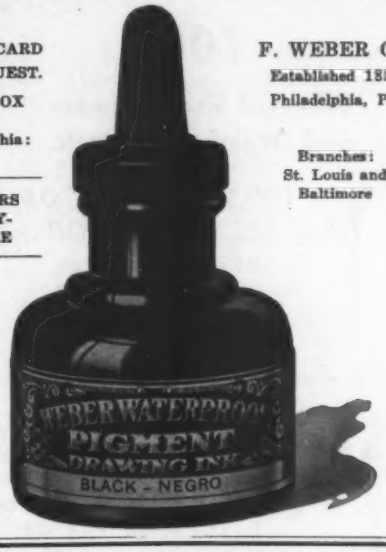

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SEND for this Catalog 34 of Stanley Tools. The new School Index suggests the proper equipment for Elementary, Junior High School, Senior High School and Vocational School Shops. You will find it helpful in making up your tool specifications.

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